

# Municipal Journal

Volume XXXVII

NEW YORK, NOVEMBER 19, 1914.

No. 21



ONE CORNER OF THE FILTER AREA.

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**Jacksonville, Fla.**—Contract for dredging in connection with municipal docks has been awarded by Board of Port Commissioners. The Home Dredging Co., of Mobile, Ala., had lowest bid and was awarded the contract.

**Joplin, Mo.**—By city to Home Tel. Co. for installation of police-alarm system to be maintained by company.

**Albany, N. Y.**—Board of Contract and Supply has awarded to Great Lakes Dock & Dredge Co. contract for dredging out Albany basin at 40 cts. a cu. yd. There are 65,000 cu. yds. to be removed in 75 days.

**Brooklyn, N. Y.**—The Knickerbocker Supply Co. was low bidder, with three competitors, for furnishing street signs in various sections of borough. Amount of bid was \$811.

**Philadelphia, Pa.**—Low bidders in eight districts who will likely be awarded contracts are: For street cleaning: James A. Mullin, \$94,700; James Irwin, \$104,038; Edwin H. Vare, \$200,000; Edwin H. Vare, \$290,000; James D. Dorney, \$131,000; Thomas E. Flanagan, \$103,309; James D. Dorney, \$162,900; David McMahon, Est., \$146,900. For removal of rubbish: James A. Mullin, \$43,770; People's Bros., Inc.,

\$48,900; Edwin H. Vare, \$70,000; Edwin H. Vare, \$82,000; James D. Dorney, \$66,000; Thomas L. Flanagan, \$83,391; Frank Curran, \$64,720; McMahon Est., \$84,900. County roads are to be cleaned twice a week. The refuse to be collected from houses is to be the property of the city, and bids for its purchase will be asked soon.

**Austin, Tex.**—Lowest bid covering all the work called for in city's specifications for concrete pier and floating wharf at dam was that of A. A. Mundt, amounting to \$13,745, according to estimate of quantities made by Assistant City Engineer Iredell.

## TOO LATE FOR CLASSIFICATION

### BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
<b>STREETS AND ROADS</b>				
Pa.	Pottsville	Noon, Nov. 16	Grading and improving ground at Hospital for Insane	Controller of Schuylkill Co.
<b>SEWERAGE</b>				
Wis.	Sheboygan	4 p.m., Nov. 14	Sewer construction	Board Public Works.
Ill.	Chicago	11 a.m., Nov. 16	Pipe sewer with brick manholes and catchbasins	E. J. Blackin, Secy. B. L. I.
Ill.	Chicago	11 a.m., Nov. 18	10-inch tile pipe sewer construction	L. E. McGann, Comr. P. W.
O.	Salem	Noon, Nov. 23	Sanitary sewer construction	I. N. Russell, Dir. P. S.
<b>WATER SUPPLY</b>				
Minn.	Aurora	8 p.m., Nov. 13	Furnish air compressor	W. J. Lord, Vil. Clk.
Wis.	Oconomowoc	Nov. 14	Laying 1,200 ft. of 6-inch main	H. A. Ernst, B. P. W.
Minn.	Alexandria	Nov. 16	Six blocks of water mains	C. I. Sundolad, City Clk.
Mass.	Beverly	7 p.m., Nov. 17	50 tons of 6-inch pipe, 70 tons of 18-inch pipe	Com. on Publis Serv. & Aid.
Mont.	Hardin	Nov. 17	Water distributing system	F. M. Lipp, Town Clk.
N. J.	Manasquan	Nov. 17	8,300 ft. water mains and sewers and sewage purification plant	Mayor and Council.
O.	Cleveland	Dec. 2	Furnishing and placing filter equipment and operating machinery	Comr. of Pur. & Sup.
<b>LIGHTING AND POWER</b>				
R. I.	Pascoag	Noon, Nov. 16	Electric lines and substation equipment	Pascoag Fire Dist. Electric Light Board.
<b>FIRE EQUIPMENT.</b>				
N. Y.	Binghamton	Nov. 18	Fire station	Board Contract & Supply.
<b>MISCELLANEOUS</b>				
N. J.	Linden	Nov. 17	Additions and alterations to Borough Hall	Clarence H. Smith, Boro. Clk.

### STREETS AND ROADS

**Fairfield, Cal.**—At meeting here Supervisors of this county have authorized County Treasurer George Weniger to purchase \$100,000 worth of State highway bonds. This will be \$250,000 worth of bonds purchased by this county, \$150,000 having been taken six months ago, and in another six months another \$100,000 will be taken. Eighteen miles of highways are now near to completion in this county, and contract for building of nine additional miles will be let on November 9.

**Oakland, Cal.**—City engineer will prepare plans and specifications for construction of concrete culverts in Sansal Creek in 31st Ave., and bids will shortly be called for.

**Placerville, Cal.**—At meeting of the City Trustees plans were discussed for making Main St. conform with State highway. A committee was appointed to interview Highway Engineers in regard to cost of continuing construction work through city.

**San Francisco, Cal.**—Board of Works has invited bids for paving Corbett Ave. from Stanford Heights to United Railroad tracks at Sloat boulevard. Pavement will be asphalt on concrete base.

**Santa Ana, Cal.**—City Board is considering proposal to pave city streets to meet county good roads on South Sullivan St.

**Susanville, Cal.**—See "Water Supply."

**Yuba City, Cal.**—State Highway Commission, upon petition of land owners along proposed State highway route, have agreed to advertise for bids for construction of 11 7-10 miles of highway from Yuba City to northerly boundary of Sutter County, which is two miles above Live Oak. Road is to be of concrete macadam construction. Engineer's

estimate is that work will cost \$9,000 a mile. It is understood \$110,000 of State highway bonds have been marketed in this connection.

**Lawrence, Kan.**—Plans for boulevard drive along western city limits, from Warren St. to University, are being prepared by Wakarusa Road and Improvement Club. The boulevard, as planned, will run west from Warren St. a half mile, then south on Township road, then east, to connect with Lawrence and University, a highway of nearly two miles, of rock, 10 ins. thick, and periodically oiled, if found necessary. Road will be 16 ft. wide.

**Gulfport, Miss.**—Surveys are being made on proposed beach highway.

**Elizabeth, N. J.**—Following bids were received for paving Bayway, from Chilton St. to Westfield Ave., previous lot of bids having been rejected because of threatened litigations between two lowest bidders: James J. Potts, \$18,558; John C. O'Neill, \$18,928.01; T. Foster Callahan, \$18,839.35; Edward L. Faughnan, \$18,783.90; Samuel Sampson, \$18,770.37.

**Linden, N. J.**—Township Committee has taken steps to macadamize Elizabeth Ave. from borough line to Rahway city line, and engineer was directed to advertise for bids to be received Nov. 23. The street will be paved with 8-in. macadam, 16 ft. wide. Section to be improved is more than a mile in length.

**Ridgewood, N. J.**—Taxpayers of Ridgewood, N. J., have voted appropriation of \$80,000 as their share toward abolishing four-track grade crossing of Erie Railroad at that place. System of tunnels will be constructed. Erie will build new depot and will expend about \$200,000 in the work.

**Roselle Park, N. J.**—Opening of Locust Ave. beneath tracks of Lehigh Valley Railroad, is being urged.

**Brooklyn, N. Y.**—At meeting of Board of Estimate following final authorization for public improvements were granted: Paving with asphalt, 15th St., from Fort Hamilton Ave. to point 215 ft. west of 11th Ave. Estimated cost, \$1,400.

**Port Jervis, N. Y.**—Proposition for improved road through township carried almost unanimously at election on Tuesday last. It involves the construction of stone road from where stone road leaves off on Clove road, near Clove Church, to and through village of Colesville and along mountain road to where road turns up to High Point.

**Rochester, N. Y.**—Ordinance has been adopted for widening of Ormond St.

**Magnolia Park, Tex.**—On Nov. 28 election will be held for voting on bond issue of \$150,000 for street improvements and water works.

**Richmond, Va.**—Council Committee on Streets has selected 14th St. as approach to Mayo Bridge and directed City Engineer to make report on plans to widen thoroughfare.

**Suffolk, Va.**—Resolution has been adopted advising State Highway Commission that funds apportioned to this county for permanent improvement of roads for year 1915 will be taken and used in Windsor district and in Newport district.

### CONTRACTS AWARDED.

**Gadsden, Ala.**—Contract has been awarded for curb and gutter on Walnut St. to C. O. Duncan for 57 cts. a sq. yd.

**St. Paul, Minn.**—For grading Wentworth St. to Martin Eberhard at \$725, and for grading Benz Ave. to Christ Johnson at \$646. Also for grading Clarence St. to Thornton Bros. at \$3,887.

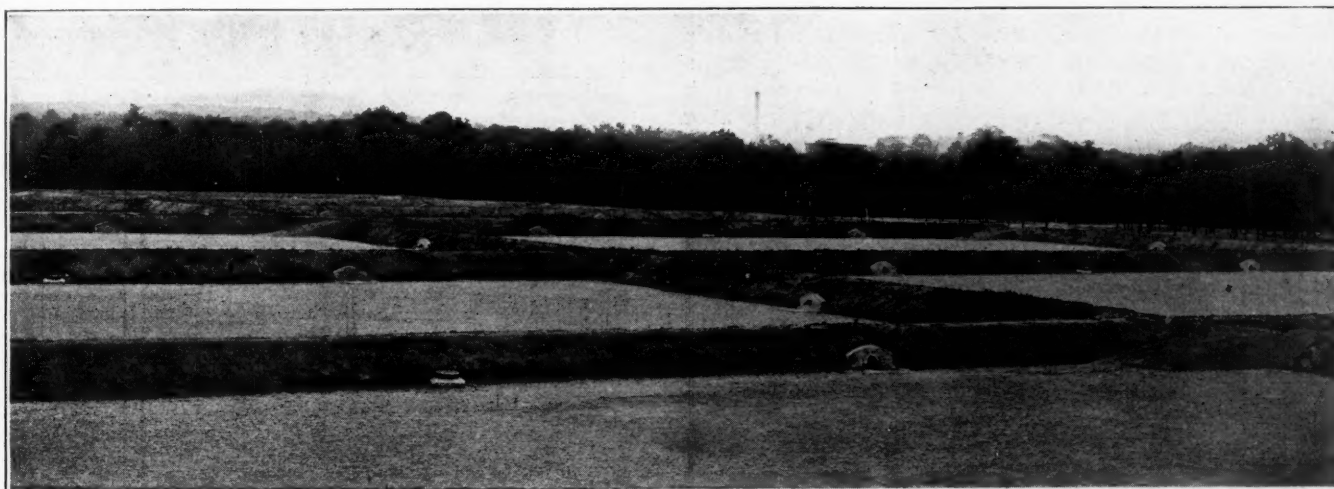
**Dormont, Pa.**—For 900 yds. grading to Richardson & Carter at 42 cts. per yd.

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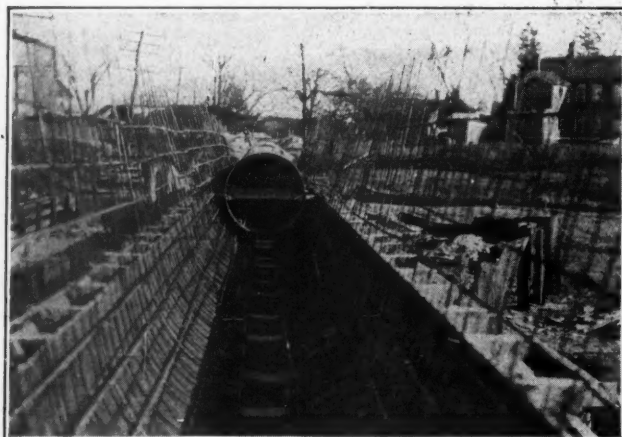
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ELEVATED 30-INCH SEWER.

pipe and supporting girder. As shown in the illustration, the pipe shell was made especially thick here, and reinforced as well. It was supported by a 24-inch girder of reinforced concrete resting on concrete piers about thirty feet apart.

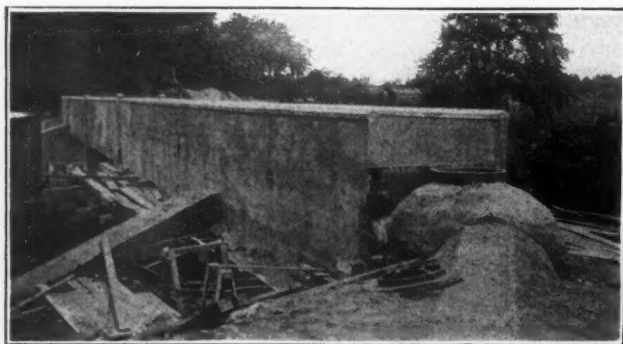


REINFORCEMENT OF ELEVATED SEWER.

There were no other especial points of difficulty in the construction of the line. Cast iron pipe was used in many places where it might have been difficult on account of mud, etc., to lay the concrete pipe. Cast iron was used where the sewer crossed under the railroad tracks also.

At the point of entrance into the filter beds, provision is made for the construction of a sedimentation tank, should one be needed later. It has been found, however, that the flow of about 5 miles breaks up all the sewage in a thorough manner, and its consistency and appearance at the filter beds are about that of dish-water.

There are twenty-six beds in all, ranged in six series of four each with two more at the entrance end. The soil in this field is excellently suited for filtration purposes and in the construction of the beds it was only necessary to grade the land to proper elevation and

ELEVATED SEWER AT DODGEVILLE.  
Serves as Floor of Foot Bridge.

shape. The filtering material is mostly sand with a slight admixture of gravel.

Each bed will take care of about 150,000 gallons of sewage per twenty-four hours, but after using for some days, usually a couple of weeks, the beds are allowed to rest for a similar length of time. In size they are 200 feet by 138 feet. There are 6 inlets to each bed, two on each side and one at each end. Pipes 16 inches in diameter convey the sewage to the embankments between the beds, whence lines of 8-inch feeders lead out to the beds. A small apron of concrete is placed at the discharge point and by means of a 45-degree bend, pointed downward, the sewage is discharged onto this apron with some force. This tends to break up the sewage and also insures a more uniform distribution over



CHARACTER OF SOIL AT FILTER BEDS.

the bed. Each discharge pipe is supposed to feed a semicircle with a radius of 50 feet.

The beds are drained by a system of pipes laid 4½ feet underground, that for each bed comprising a central line of 12-inch vitrified pipe and four 3-inch feeders on each side of this. The joints of the 12-inch pipe were cemented only at the top and bottom, allowing free ingress of water at the sides, while the 3-inch pipes were not cemented at all, but cheese-cloth was placed in the joints to hold them in place and selected sand and gravel were carefully packed around them.

At the lower end of each bed is a manhole through which the 12-inch discharge pipe passes. Thus samples of the effluent from any bed can be secured conveniently and a careful watch kept of the performance of each bed. These 12-inch main drains discharge the effluent into Ten Mile river.

#### CLEVELAND'S SEWAGE TESTING STATION.

In an article under this head published by us on October 15, the statement was made that "The testing station has been under the general direction of the Department of Public Utilities, of which Charles W. Stage is now director." Mr. Pratt informs us that, while the department named has charge of the water purification, it has nothing to do with the sewage work, which is under the charge of the Director of Public Service, of which Thomas L. Sidlo is director, succeeding W. J. Springborn.

## OPERATING SEDIMENTATION TANKS

### Conclusions from German Experiments, Referring Chiefly to Imhoff Tanks—Causes of Evil Smelling Sludge, Scum and Frothing—Other Tanks.

Studies, experiments and tests concerning methods of operating Imhoff tanks and kindred sewage clarification processes have been for several years occupying the attention of Professors K. Thumm and C. Reichle, division superintendents of the Royal National Institute for Water Hygiene of Germany, concerning which they have recently made a report of great interest and apparent value, of which we present herewith a fairly full abstract.

The studies upon which the report was based were undertaken largely because of the difficulties which were arising here and there in the operation of two-story sedimentation tanks; which difficulties were to a large extent due to the fact that too many of them were built all from a uniform pattern and without sufficient consideration being given to the character of the sewage to be handled and of the sludge, and that they were operated under the supposition that the process was nearly automatic. A number of the points raised by the difficulties experienced will require further investigation, but concerning others the investigators are quite confident of their ground. The points especially discussed were: 1, The formation of acid sludge in the sludge digesting chamber; 2, the formation of a floating cover; 3, frothing and spitting.

#### FORMATION OF ACID SLUDGE.

Imhoff tank sludge has a deep black color given to it by ferrous sulphide and will naturally react alkaline, as it is impossible for it to exist with free organic acids. Water drained from the sludge does not smell putrid, but contains ammonia and free carbonic acid and reacts alkaline, as does all normal clarified or raw sewage. Occasionally, however, sludge from tanks of this type, especially if left in the sludge chamber for a few months, is not black, but is yellow, grayish yellow or gray, has an evil smell, is very difficult to drain and has a distinct acid reaction. The water in the sludge contains some ammonia, but gives a distinct acid reaction, which reaction will finally be given by the water throughout the chamber. The same color is found in Imhoff tank sludge while in the process of ripening, but the reaction of both sludge and water is alkaline, the water is easily filtered off and the nearer ripe the tank is the easier the sludge can be drained.

Fermentation (that is, acidulation) and putrefaction phenomena are found side by side in municipal sewage. The floating scum of the septic tank, which is the result of an accumulation of carbon hydrates, is of a gray brown color and reacts distinctly acid, because the sewage which has the ability to neutralize these acids can not come in contact with the scum cover, while the nitrogen, i. e., ammonia, in the scum is not sufficient to neutralize the acids. The remainder of the tank and sludge are both alkaline, which is indicated by the dark color caused by ferrous sulphide, and any acid introduced here is immediately neutralized by the free ammonia.

Where there is a preponderance of carbon hydrates and a small amount of nitrogen combinations, such as ammonia and other bases, acid sludge must be expected with every method of separate sludge digestion, and finally acid supernatant water also, as the acid reaction progresses. On the other hand, a preponderance of nitrogen combinations or other acid neutralizing matter assures the formation of alkaline sludge and alkaline water in the sludge digesting chamber. Considerable acid neu-

tralizing ability will guarantee good Imhoff tank sludge having an alkaline reaction.

Fresh sewage sludge has, as a rule, very small acid neutralizing power, except when it is rich in lime. It is poor in nitrogen and consequently in ammonia, which generally represents the neutralizing ability of the sludge. Sludge a few days old, drawn from the bottom of a sludge digestion chamber which had not been stirred, reacted acid, as is always likely to be the case with thick scum covers, strong suspended layers and sludge digesting chambers more or less filled with sludge. As compared to these, normal municipal sewage possesses high acid neutralizing ability, and as a rule the only practicable method of preventing the formation of acid sludge is to bring the sludge into intimate contact with a sufficient amount of sewage (or other acid neutralizing bodies) to make harmless all acids which may be formed.

To obtain good (alkaline) sludge, the important points to be considered are the sewage, the thorough mixing of this and the sludge, and the proper proportion between the two.

This subject was studied by the authors of the paper by means of an agitator used in a modified Imhoff tank known as the Kremer-Imhoff tank, installed in the summer of 1909. Before this, bad sludge, spitting, frothing and the formation of scum were experienced, but with the use of the agitator the sludge became alkaline and of a better character. An effort was made to prevent the formation of scum and frothing by withdrawing the sludge, but in spite of this, at times the whole contents of the sludge digesting chamber threatened to boil over.

In December, 1910, a trial was made of draining off the supernatant water and refilling the digesting chamber from the top with clean water from the water mains, and the sedimentation chamber with sewage, and then renewing the regular operation. A week later, satisfactory typical Imhoff sludge appeared for the first time, and continued of good quality until the plant was discontinued two years and a half later. Clean water was added only this once, but the agitator was run for a short time every day, and every Saturday an exact pre-determined amount of sludge was withdrawn from the sludge digesting chamber. Care was taken that after the withdrawal of the sludge, the proportion of sludge and water in the sludge digestion chamber remained in the ratio of 1 to 2. Frothing and the formation of injurious scum did not occur again. The cause of this result was that the supernatant water became septic and had a high acid neutralizing ability, and the mixing of this with the sludge prevented the formation of any acidity of the latter.

Continued clean water treatment would remove the injurious products of fermentation, but at the same time it would also remove the useful ammonias. A limited addition of clean water may be of some use, especially if the water has considerable temporary hardness, but continual addition of clean water does not seem advisable unless its acid neutralizing qualities can be increased by adding to it suitable bases. In Nordhausen, sludge which was occasionally treated with clean water reacted alkaline, as did the supernatant sewage; but the sludge in another digestion chamber which was continuously treated with clean water from below was acid and poor, and the supernatant sewage also was acid.

Alkaline sludge could be secured by the addition of lime, chalk, soda, ammonia or sludge containing sewage, as well as by the addition of raw sewage as recommended above; the alkaline material being thoroughly mixed with the contents of the chamber. Generally, however, a good mixture of the sludge with acid neutralizing sewage is sufficient, and this can be obtained in the Imhoff tank by

regular withdrawals of sludge. If the sludge reacts acid and the supernatant sewage alkaline, one or several thorough mixings of the sludge with the sewage and regular withdrawals of the sludge may bring about the desired result. If both the sludge and the supernatant sewage are acid, it is best to drain off the supernatant sewage, add some acid neutralizing agent and mix it thoroughly with the sludge and fill again with sewage. The sludge should be drawn off regularly after this, and acid neutralizing agents added if necessary. If there is much yellow sludge present, it would be best to wash the sludge with sewage, thoroughly stirring it meantime by an agitator or by compressed air.

If alkaline bases are added to the sludge, care must be taken to secure a thorough mixing with it; this being especially the case if bases are used which are only partially soluble in water, such as lime, etc. If lime is added to the sewage before sedimentation, a very good mixture of the sludge and lime is obtained, and the former will have high acid neutralizing properties. With such treatment, the supernatant sewage also possesses more than ordinary acid neutralizing ability, and the proportion of 1 to 2 between sludge and water need not be so strictly adhered to. (It is recommended, however, always to maintain this proportion, as there is always the possibility of the precipitation of an unexpected amount of sludge). Where the sewage is already rich in lime, it should produce the favorable conditions secured by adding lime to ordinary sewage. The presence of lime in sludge is always desirable. The authors treated a certain sludge obtained near Berlin, precipitated by lime and alum, with a large amount of fresh water daily, but in spite of this always obtained good alkaline sludge.

It is suggested that, to insure the drawing off each week of the pre-determined amount of sludge, the drying beds be so partitioned that the sludge can easily be measured. Frequent tests for acidity should be made of both sludge and supernatant sewage. It should be borne in mind that not only organic acids but also carbon dioxide, mineral acids and sometimes acid salts may cause acid reaction.

#### FORMATION OF SCUM AND FROTHING OF TANKS.

The causes and effects of the formation of a scum cover and of the frothing of sludge digestion tanks depend on whether the sludge is already ripe or is yet in the ripening period. The difficulties in the latter case are not so great as in the former. The conclusions of the authors in regard to scum and frothing are based upon their experience with septic tanks, but they believe that the principles apply to sludge digesting chambers as well.

Scum is caused by a skin of micro-organisms and particles of fat which float upon the surface; to which adhere particles of sludge raised from the bottom by gases formed in them, and the cover thus increases in thickness. With purely domestic sewage, only a floating cover is formed, with practically no layers in suspension. Where silt-carrying storm water and industrial wastes carrying heavy matters are introduced, suspended layers are formed, and if storm water only is handled the floating cover entirely disappears.

In the Imhoff tank, scum is formed only from the sludge in the digestion chamber which obtains its floating properties from the entrained gases of decomposition. The rising to the surface and remaining there of single sludge particles or whole sludge cakes is doubtless dependent on the composition of the raw sludge and the intensity of the gas formation. Fresh sludge will cause more floating scum than putrefying sludge. A sludge with a larger proportion of organic matter will, under the same circumstances, be less apt to form scum than will a highly organic sludge containing a great amount

of cellulose. The size of the deposited sludge particles also plays an important part. Disintegrated particles, if not too fine, will gasify much more quickly than coarse ones. Scum is thicker and more resistant which results from sewage in which the sludge matters have not been finely comminuted. Finally, the manner in which the sludge particles settle, their adhering together as affected by fat, hairs, etc., has great influence on the formation of sludge cakes, which to a great extent form the scum. The deeper the sludge layer, the greater the influence of the intensity of the gas formation. With a small free surface for receiving it, the scum cover will be thick; and if the surface is too small for the scum, too many gas-laden particles will arise, so that the top layers cannot get rid of their gas quickly enough to sink, they will be held up by the floating sludge underneath which cannot get rid of its gases, new gases will be formed in the scum cover itself, and thus the volume of scum and its thickness will steadily increase.

A disadvantage of a scum cover is that after it reaches a certain thickness, the rising sludge cakes seek a way out through the slots communicating with the sedimentation chamber. The principal disadvantage, however, is that the sludge cannot get rid of its bad qualities, because it does not get mixed with the sewage, and the sludge digesting chamber will ripen slowly or even not at all. Different methods have been tried for destroying and sinking the scum covers, such as stirring it with poles or breaking it up with high pressure water. None of these has been a permanent success, as they do not accomplish the necessary continued mixing of the ever rising sludge, which can be done only by the installation of a mechanical agitator, an apparatus which not only stirs the sludge, but brings about a thorough mixture of the sludge with the sewage. Scum is generally to be expected with sewage rich in organic matter, but is to be prevented as far as possible. Sludge entering the sludge chamber should be well disintegrated; any scum cover should be broken up, while forming, by a stream of sewage under high pressure, mechanical agitators or lowering the water level in the sedimentation chamber.

The plant should always be designed to have a surface sufficiently large for the escape of gases.

Frothing in an unripe sludge digesting chamber is merely a secondary phenomenon, generally caused by large amounts of gas rising to a small surface and carrying the sewage and finely divided sludge with it in the form of bubbles. In ripe sludge digesting chambers, the scum formation is much lighter and is not liable to cause trouble, as the rising sludge is well mixed with sewage and the sludge at the surface loses its gas more readily than fresh sludge and does not form as much gas. The scum should be removed from time to time, however. Spitting and frothing and entrance of sludge into the sedimentation chamber are generally caused by the accumulation of too heavy a scum or of too much undissolved matter in the sludge digestion chamber, in which case the gas will carry up froth if the free surface is too small. This can be prevented by keeping the sludge at a permanent level. Sludge accumulation above a certain volume makes the withdrawal of a part of the sludge an absolute necessity under all circumstances. Waiting will not better the condition of the plant but will only make matters worse, as the continual depositing of sludge in the sludge digestion chamber will only increase the already over-balanced proportion of sludge to water.

#### OTHER SLUDGE DIGESTING PLANTS.

The authors consider in this connection other sludge digesting plants than the Imhoff, dividing these into two groups. The first includes those in which the sludge digesting chamber is below the sedimentation chamber and

connected to it by open slots, through which the sludge drops automatically. Under this head come the Imhoff, Travis, Kremer-Imhoff, Stiaq, Spree, Bus tanks, etc. To the second group belong those in which the sludge digesting tank is a separate unit and is located beside the sedimentation chamber, the fresh sludge being periodically pumped or drained from the sedimentation tank to the sludge digesting chamber.

The first group of tanks have the advantage of automatic sludge separation. Some of the disadvantages are the poor operation of the sludge digesting chamber; the fact that if the sludge is not removed at the right time, rising sludge or scum will enter the sedimentation tank, which is a common occurrence in spite of the overlapping edges of the slots; and the difficulty found in giving the right dimensions to the sludge digesting chamber in proportion to the sedimentation tank. Tanks of this class require expert supervision while ripening. To avoid acid sludge or a heavy sludge cover (which almost always gives an acid reaction), it is recommended to fill the digesting chamber only partly with sludge during the ripening period, and always keep the sludge at the same level by periodically removing the same amount of sludge. The sludge must be kept alkaline at all times, by the addition of chemicals if necessary. The free surface of the sludge digesting chamber should not be too small, in order to prevent floating sludge covers. The partition walls between sedimentation and digesting chamber should be so arranged that no sludge can collect under them, and that the sludge carried up by the gases will be deflected either to the open surface at one side or to gas vents directly over the digesting chamber, which vents should be of ample size. Wide longitudinal openings such as are used on the Travis tank seem to be the best. The long sludge chamber should be divided into two parts, a larger chamber in which the sludge is deposited and a second smaller chamber in which the sludge particles carried up by the gases are separated. To obtain the largest possible surface and low construction costs, earth ponds with large free surfaces are sometimes recommended as sludge digesting chambers.

Under the second class of tanks come the designs of Foerster, Mondrion, the Neustadter sludge tank, etc. Offsetting the cost of pumping, in the case of these tanks, is the considerable advantage of the complete separation of sedimentation tank from sludge tank, so that the latter can never have any detrimental influence on the former. The sludge tanks can be given any size desired, are very accessible and easily inspected. The action of the tank can be watched closely and carefully controlled. Especially where the ground water stands high, the first cost of the shallow tanks will be considerably less.

Separate sludge digestion tanks can be built as single units which are intermittently filled (Foerster) or as a series of tanks which make continuous operation possible (the Neustadter). Good sludge digestion is obtained by both types, but the former requires individual expert operation, while the latter can be made almost entirely automatic. The Foerster tanks can easily be constructed so that the tanks can be operated either as units or in series; and if the latter, the processes can be separated, the violent decomposition of the sludge and sewage taking place in the first tank and the sludge being washed in the last tank by the introduction of clean water before it is drawn off.

Sewage treatment plants which afford a sludge digestion chamber separated from the sedimentation, are a distinct advance in the field of sewage treatment, but very careful preliminary investigation should be made in each case to find out whether such a process is suitable to local conditions. When the plants are built by contractors,

towns should not accept them until the sludge digestion chamber delivers a good sludge. Among other points, consideration should be given to the question whether it is best to install an agitator or to make provision for a future installment of one. It is absolutely necessary to stop the now too prevalent custom of building all plants after one pattern, but with expert design and expert operation it is possible to avoid the troubles above described which often make extremely unsatisfactory a plant which would otherwise give excellent results.

## NOTES ON IMHOFF TANK OPERATION

### Causes of Foaming and Suggested Remedies—Constructing Distributing Channels to Prevent Deposits Therein—Suggestion for Screen Pits.

By FRANCIS E. DANIELS, A. M.\*

#### FOAMING.

During the present summer two very interesting occurrences have taken place at two New Jersey sewage disposal plants. The happenings were similar, although one tank was new while the other had been in operation for about two and a half years. In both cases excessive foaming or frothing occurred in the gas vents, which for a time caused considerable trouble and uneasiness. In one case the froth would boil over the vent walls in a couple of hours and cover the settling compartments, causing a perceptible increase in the turbidity of the effluent. In the other case, on account of the very high walls the froth did not get over, although it became five or six feet thick during the times it was left undisturbed.

Ordinarily there is no foaming whatsoever in the gas vents of the Imhoff tanks. The solids which are brought up by the gases, when broken up by means of a paddle or jet of water, settle very quickly except for such particles as grease, match-sticks, tomato peels and certain fresh materials which have not yet become sufficiently disintegrated. Under this layer of floating matter is a stratum of comparatively clear and watery liquid, which is incapable of sufficient surface tension to hold the gases in the form of bubbles to constitute a foam.

The sudden behavior of these two tanks was naturally watched with interest and it must be confessed that at present the writer is not in a position to state positively what the cause really was, but after describing events leading up to the occurrences, he will give what he believes to have been the cause in each case, and the precautions to be taken to prevent such happenings in the future.

Take the first case. Here conditions were somewhat abnormal. The plant was constructed at the end of a comparatively short sewerage system, with a new outfall which was almost perfectly water tight. On the day the plant was put in operation the ground water flowing in the outfall was less than a quarter of an inch deep. The tank itself was empty. The sewage, which up to this time had been disposed of on a large broad irrigation area, was of a very strong character and heavily charged with suspended matter.

The connection leading to the old field was broken and the strong sewage was turned into the empty tank on April 1, 1914. For a while nothing unusual happened and the attendant was instructed to break up the scum as it formed. Upon the advent of hot weather the tank

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This article was written about six weeks ago, before Mr. Daniels had heard of the conclusions of Prof. Thumm and Reichle abstracted in the previous article. It is interesting to compare the two opinions, arrived at independently.

got the better of the attendant and the writer was asked for advice. It was then noted that matters were getting serious. The scum had become several feet thick in the side vents and in the center vents it was over thirteen feet deep. There was no sludge whatever at the bottom of the tank. The side vents are wider than ordinary, which is a very good feature, considering the sewage at this place. The central vents, however, are chimney-shaped and but three in number, located over the A-shaped central slope. This is very unfortunate, as it is impossible to clear out the accumulated scum under the central A-shaped slopes. The troubles are further aggravated by flat horizontal beams under the slopes, which seem to catch and hold scum. Also the work on slopes and vents is interfered with by numerous and very wide concrete foot-ways across the tank. The accumulations had become so great that ebullition was taking place up through the slots.

Since the tank was single, and no portion could be cut out, something had to be done quickly to relieve the situation. The flow was reversed and with the aid of an extra man the scum which could be reached was churned down. It was unfortunate that a water pressure was not available, as this would have been of great assistance. Even a portable pump, using some settled sewage, would have helped. The side vents gave little trouble, but the central chimneys began to foam with great rapidity. Little difficulty would have been experienced with this had a supply of clear water been available, as the foam is easily subsided by a spray of clear water. In order to protect the settling chamber the attendant decided to dip off and remove the foam every day, although it ran over during the night. In a few weeks the tank began to show signs of being quieter, especially as the summer flow of sewage was comparatively light. The attendant was told not to remove any more scum unless there was danger of an overflow. Conditions are now getting to be more nearly normal, although on account of lodged scum under the slopes there is a constant bubbling of gas along the line of the slots.

While the writer has no positive proof as to the cause of the foaming, he has this theory: The filling completely with such a strong sewage put so much matter in the sludge compartment that, when violent ebullition occurred, the liquids were so viscous that the gas bubbles would not break and a froth resulted—the whole mass “working over” much like a barrel of cider. After the tank has “worked” itself out, the supernatant liquid loses its viscosity and the gas bubbles break without causing any foam. Then as new matters come in they are not added fast enough to upset this equilibrium, and in this regard the tank takes care of itself. If, however, it should be drawn down very low and refilled with raw sewage, a repetition is likely to occur, as will be shown presently.

The writer believes that before the tank was put in commission, a fire hose should have been turned into the sewer and the tank filled with clean water, after which the sewage should have been turned on. This would have given a supernatant liquid of low viscosity from the start, which would have allowed the gas bubbles to break. It is further believed that even after the foaming had begun, had clean water been available and about a half tankful carefully run into the gas vents, the troubles would have been lessened, or the foaming could have been effectually kept in check by a constant or frequent spray of clean water.

Usually there is considerable ground water in a plant before starting, but where this is not the case it would appear that the tanks should be filled with clean water before turning in the sewage.

On account of the lack of water and the trouble caused by the foaming, the writer was unable to test out his theory.

It might be mentioned that kerosene breaks the bubbles and keeps down the foam excellently for a short time, but as solid matters are brought up they mix with and absorb the oil, so that the remedy is only temporary and foaming again begins. The scum mixed with the oil is also harder to settle. The application of lime seemed to have no beneficial effect in reducing the tendency to foam.

Close observation of this new tank has tended to strengthen the writer's views which he has before expressed, viz.: that the gas vents should be of ample size and easily accessible; that the under sides of slopes should be made smooth and without any projecting ledges or pockets; that the chimney form of vent should be discarded and the vent opened up for the whole length; that wherever possible a supply of clean water should be furnished, and that in designing tanks the character of the sewage should be considered more carefully than now is usually the case. A tank that will work excellently with one sewage may become almost a failure when taking a sewage of a different character.

The second case was with a tank that had been running two and a half years and had never foamed. Just before the hot weather this tank was drawn down for some repairs and allowed to refill with raw sewage during a dry time, after which violent foaming occurred. The writer happened to make the plant a visit just at this time, and after trying several things, advised the use of a stream of settled sewage from a portable gasoline-engine pump which is kept at the plant. By this means the foam was quickly settled and kept down until the tank had “worked” itself off. In this case the writer believes it would have been better to have refilled the tank with settled sewage from one of the other tanks, or better still, with the supernatant liquid from an adjoining tank which had been standing idle for some time.

The other tanks at this plant, which had not been disturbed, worked right along without showing the slightest indication of foaming.

#### DISTRIBUTING CHANNELS.

Recently the writer, in observing the operation of a new Imhoff tank, was struck by the dissimilarity between conditions in the terra cotta sewers and in the concrete conducting and distributing channels at the tank. It is now well recognized that sewers should be smooth and with as small a wetted perimeter as practicable, yet little if any attention is paid to those requirements at the tank. In this case the concrete was very rough, the conduit was rectangular, and the fastest particle moving in the flow was traveling at the rate of but four inches a second. It is needless to say that an enormous amount of sedimentation was occurring in the channel, which no amount of stirring could prevent in this eighteen-inch depth of sewage. It occurred to the writer to wonder why it is that such channels are not made very smooth and semi-circular or egg-shaped, instead of rectangular.

It is recognized that the lack of head necessitates certain constructions which would not otherwise be permitted, but other things being equal, sewage should be transmitted and distributed with a cleansing velocity until the settling chamber of the tank is reached. While the writer has usually advocated the use of pipes for distributing purposes, it seems that some such conduit as suggested might be made more satisfactory than those of the present practice.

It might be interesting to mention that shortly after making the above observation the writer happened to

drop in on an engineer and noticed that this engineer was at work on a set of plans for a new sewage plant which was to have *semi-circular distribution channels*.

The large rectangular channels across the ends of Imhoff tanks, separated from the settling compartment by a weir, cause no end of trouble, and while the writer has usually advocated a pipe for inlet and a weir for outlet, it has occurred to him that a semi-circular channel with a long slot in the bottom, might be a good combination for inlet and outlet for reversible tanks. The slot could be formed in glazed terra cotta or moulded in smooth concrete.

Sewage and solids would pass through the slot and a sweep of a broom now and then would dislodge and push through anything caught. Rectangular channels with holes and plug valves have been used, but it seems that these long slots would be an improvement over the holes.

The effluent would also travel up through the slot and the flow line could easily be controlled by a short weir across the end of the outlet channel.

#### SCREENS.

The writer has always opposed the use of screens except where it is very necessary to have them. Heretofore their use has always resulted in the settlement of large amounts of organic matter in the screen pits, which would be better off for all concerned in the tanks.

The nuisance of screen pits is usually caused not so much by the things which the screen removes as by the substances which are deposited solely on account of the lessened velocity in the pit.

In considering the matter it has occurred to the writer that in many cases the screens could be arranged over the end of the tank and then only what was really desired would be arrested. All other matters could pass along a steep sloping bottom, and slide into the tank along with the rest of the settled matter. In this manner some objectionable objects might be caught without the usual disagreeable features of screen pits.

#### INSPECTING TROLLEY CARS.

Twenty-three hundred car inspections were made during 1913 by the trolley inspector of Newark, N. J., the inspection relating to brakes, wheels, gears, fenders, heat, ventilation, signs and sanitary conditions. Four hundred and eighteen flat wheels were removed, as were 135 defective fenders. Noisy gears caused the removal of 50 cars and 30 more were removed for mechanical defects. During the year there were 852 cars in service in the city, an increase of 12 over the previous year.

#### SEWER WORK IN SEATTLE.

During the year 1913 the Department of Streets and Sewers of Seattle, Wash., Chas. R. Case, superintendent, had under maintenance an average of 401.26 miles of sewers, the cost of maintaining which was \$35.10 a mile. This included 9,221 catch basins, in keeping which clean there were made 66,096 cleanings, or an average of 7 1/6 times per year for each basin. There were removed 15,333 cu. yds. of material, or 0.23 cu. yds. per cleaning. On this work there were used 4,540 days of labor and 1,049 days of 2-horse teams and teamsters. The average number of cleanings per man per day was 14,556; the average number of cubic yards per day per man was 3.377, and per team 14.609. The average cost of each catch basin cleaning was 23.25 cents, or \$1 per cubic yard removed. Laborers and teamsters were paid \$2.75 per day of 8 hours.

Sewers were flushed by men paid \$3 per day of 8

hours. The number of these employed, by monthly averages, varied from 9.33 in February to 19.55 in July, averaging 15.43. Sixteen flusher wagons are owned by the department. The total cost for the year of cleaning sewers was \$7,862; of cleaning drains, \$1,941, not including general overhead charges.

### OPERATION OF SEWAGE DISPOSAL PLANTS.

By FRANCIS E. DANIELS, A. M.\*

This is the eleventh installment of a series of articles by Mr. Daniels. The others were as follows: January 15—Grit chambers and screens; regular frequent cleaning most important. February 19—Skimming, sedimentation and septic tanks; keeping daily records of operation; duplicate units; treatment of sludge and scum. March 10—Emscher tanks, principles of operation and design; baffles and scum boards; gas vents and scum; cleaning slopes and slots; drawing off sludge; sludge beds and sludge disposal. April 16—Contact and sprinkling filters—periods for each of the four phases; filtering medium and drainage; keeping surface open; automatic control apparatus; how to make putrescibility tests. May 21—Sprinkling filters, care of nozzles, settling basins; natural and artificial sand filters. June 18—Operation of sand filters; land treatment; sub-surface irrigation, July 16—Disinfection; purpose, principle, history. Condition of sewage necessary. Application of hypochlorite. August 20—Purchasing hypochlorite; apparatus for applying it. Liquid chloride. September 17—Chemical precipitation. Electrolytic treatment. October 15—Separate treatment of trade wastes. Chemical precipitation and grease recovery. Experimental stations.

#### TESTS.

A man in charge of a sewage disposal plant should know what each unit of his works is doing every day. A skilled observer may detect faults and short-comings with some degree of certainty by mere inspection; and if the output is bad and a heavy pollution is occurring or a local nuisance is resulting, it is not at all difficult to recognize the trouble. If the break-down has been sudden and due to a wash-out, a broken bed or wall or some other equally obvious cause, an expert is not needed to diagnose the case. But suppose the output of a plant or of some of its units is gradually falling below the requirements. In that case the gradual decline cannot be detected by observation and in order that one may know what is actually happening, tests are made. If frequently performed and recorded in a convenient scheme for comparison, much valuable information is obtained and a close check can be kept upon each and every unit of the plant, in order to head off or delay the necessity of extensive and costly renovation, which is bound to occur unless proper attention is given in time. Careful attention paid to tank effluents will delay for years the expenditure of thousands of dollars for the removal, washing and replacing of the stone in contact beds. Poor effluents discharged upon sand beds cause clogging quickly, which results in undue expense for frequent cleaning and often the sand filter effluent is seriously impaired.

To the trained man in charge of a plant equipped with a laboratory, little advice is necessary. His training and facilities enable him to keep close check upon his charge; but for the good of the cause he is especially urged to do routine work along the standard lines and so record it that his results can be of use to others besides himself. His tests should conform to the requirements laid down in the "Standard Methods of Water Analysis", published by the American Public Health Association. At the present writing a committee of that association is at work upon a report setting forth a uniform and comprehensive scheme of tests and records

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for sewage treatment works, so that results and data obtained by one observer may be compared with those derived by another. The publication of this forthcoming report is awaited with eager interest. It is hoped that it will develop a systematic and more widely spread corps of observers, while at the same time tend to check much comparatively useless routine, energies upon which might be more profitably spent in other directions.

To the untrained or partly experienced plant attendant who is anxious to learn, a few simple tests may be explained, which if carefully performed and recorded will not only become of great use in connection with the works at hand, but will also be of considerable benefit to the general cause of sewage treatment.

Reference to some of these have already been made in the foregoing pages under the several topics concerned, but for the sake of easy reference these will be repeated briefly in this chapter, and the attendant is urged to perform such as will enable him to run his plant in the most intelligent and efficient manner possible.

One of the prime requisites for all classes of plant attendants is a keen eyesight, coupled with a well-developed sense of perception. Close observation will teach him from what, where and when to take samples for his tests. Unless this is properly done and recorded with sufficient explanation to describe the sample accurately, the results mean nothing; and in addition, are dangerously misleading in the hands of the inexperienced or unsuspecting.

The tests given below have for the most part been taken bodily from the pages of the "Standard Methods" (to which the reader is referred), although in some cases slight modifications have been made.

#### TOTAL SOLIDS.

Procedure.—Ignite and weigh a clean platinum dish and into it measure 100 c.c. of the liquid. Evaporate to dryness on a water bath, dry in an oven, cool in a desiccator and weigh. The increase in weight gives the total solids.

#### LOSS ON IGNITION.

Heat the platinum dish containing the residue in a "radiator" which consists of another platinum dish large enough to allow an air space of about half an inch between the inner and outer dishes, the inner dish being supported by a triangle of platinum wire laid on the bottom of the outer dish. Over the inner dish is suspended a disc of platinum foil large enough to cover the outer dish, to radiate the heat into it. The larger dish is heated to bright redness, until the residue is white or nearly so. Allow the dish to cool in a desiccator and weigh. This weight gives the fixed solids and the difference between it and the total solids gives the loss on ignition. An electric muffle furnace may be used for the ignition. Care must be used and the temperature not allowed to get too high or else some of the mineral salts will be volatilized.

#### TOTAL SUSPENDED MATTER.

Procedure.—Filter a definite quantity of the liquid, depending upon the amount of suspended matter contained, through a tared gooch crucible by means of a suction apparatus. Dry in an oven and cool in a desiccator and weigh. This gives the total suspended solids.

Carefully ignite, cool in desiccator and weigh. This weight gives the fixed solids and the difference between it and that of the total suspended solids gives the volatile suspended solids.

#### SUSPENDED MATTER WHICH WILL SETTLE BY VOLUME.

Apparatus.—Tall straight-sided or conical glass vessels of 1 liter capacity, having a tapering interior at the bottom which is graduated in cubic centimeters.

Procedure.—Fill the glass to the liter mark with the sewage or effluent. After the specified time read the volume of the sediment by means of the c.c. graduations at the tapering bottom. During the settling carefully dislodge by means of a wire or glass rod any particles caught on the sides of the vessel.

For comparison of tank influent and effluent, take a representative sample of influent and, after the "flowing through" time has elapsed, a sample of the effluent should be taken. The results of the two samples may be compared to show the tank removal of suspended matter. The physical char-

acteristics of the sediment should be observed as carefully as possible and recorded so that there may be less chance for errors in drawing conclusions.

#### CHLORINE.

Reagents.—1. Standard salt solution. Dissolve 16.48 grams of fused sodium chloride in distilled water and make up to one liter. Dilute 100 c.c. of this stock solution to one litre in order to obtain a standard solution, each c.c. of which will contain .001 gram of chlorine.

2. Silver nitrate Standard. Dissolve about 2.40 grams of silver nitrate crystals in one litre of distilled water. One c.c. of this will contain approximately .0005 gram of chlorine. Standardize this against the standard salt solution.

3. Potassium chromate. Dissolve 50 grams of neutral potassium chromate in a little distilled water. Add enough silver nitrate to produce a slight red precipitate. Filter and make up the filtrate to one litre with distilled water.

Procedure.—Use 10 c.c. of the sample in a white six-inch porcelain evaporating dish when the chlorine content is not excessively high or low. Dilute to 50 c.c. with distilled water and add a definite quantity of the potassium chromate solution as indicator. Titrate with the silver nitrate solution, under similar conditions as to light, volume, temperature and indicator as were used in standardizing the silver nitrate solution.

#### TOTAL ORGANIC NITROGEN.

Reagents.—1. A 30 per cent solution of copper sulphate.

2. A 5 per cent solution of potassium hydrate.

3. Concentrated C. P. sulphuric acid.

Procedure.—Take 50 c.c. of the sample and add 5 c.c. concentrated C. P. sulphuric acid and 3 or 4 drops of a 30 per cent solution of copper sulphate. Digest in a Kjeldahl flask over a flame under a hood until colorless. While hot add a few crystals of potassium permanganate until a heavy green precipitate persists in the liquid. Cool, Dilute to 250 c.c. and mix. Allow to stand until the manganese compounds have well settled out, otherwise a greenish solution will result upon the addition of potassium hydrate. Pipette out 20 c.c. of the diluted mixture and add an equal amount of 5 per cent potassium hydrate. Filter and pipette out an aliquot portion into a Nessler tube. Make up to the mark, mix and nesslerize in ten minutes. Read by comparison with Nessler standards and calculate in parts per million (see "Standard Methods"). Should the solution be turbid upon the addition of the 5 per cent potassium hydrate, use an 8 or 10 per cent solution. The 5 per cent solution is not strong enough for some sewage.

It is advisable to run a blank and apply the proper corrections if necessary.

#### NITROGEN AS FREE AMMONIA.

Reagents.—1. A 10 per cent solution of copper sulphate.

2. A 10 per cent solution of lead acetate.

3. A 50 per cent solution of potassium hydrate.

Procedure.—Fifty c.c. of the sample are mixed with an equal volume of water, and a few drops of the copper sulphate solution are added. After a thorough mixing, one c.c. of the potassium hydrate solution is added and the contents are again thoroughly mixed by shaking. The solution is then allowed to stand for a few minutes, when a heavy precipitate should fall to the bottom, leaving a colorless supernatant liquid. Nesslerize an aliquot portion of this clear liquid. Usually 4 c.c. of the mixture will be sufficient to fall within the range of the Nessler standards.

Many samples containing hydrogen sulphide require the use of lead acetate in addition to the copper and with others a little magnesium chloride is said to be of service.

#### NITROGEN AS NITRATES.

Reagents.—1. Sulphanilic acid solution. Dissolve 3.3 grams of sulphanilic acid in 750 c.c. of water by the aid of heat. Add 250 c.c. of glacial acetic acid and make up to 1 liter.

2. A-naphthylamine acetate solution. Boil 0.5 gram of solid a-naphthylamine in 100 c.c. of water for 5 minutes. Filter through a plug of washed absorbent cotton. Add 250 c.c. of glacial acetic acid and dilute to 1 liter.

3. Sodium nitrite stock solution. Dissolve 1.1 gram silver nitrite in nitrite-free water; precipitate the silver with sodium chloride solution and dilute the whole to 1 liter.

4. Standard sodium nitrite solution. Dilute 100 c.c. of solution (3) to one liter, then dilute 10 c.c. of this solution to one liter with sterilized nitrate-free water, add one c.c. of chloroform and preserve in a sterilized bottle. One c.c. = 0.0001 mg. nitrogen.

Procedure.—Take 10 c.c. of the sample and 90 c.c. of water in a low form 100 c.c. Nessler tube and add 2 c.c.

of each of reagents Nos. 1 and 2 and mix. Let stand and read in 10 or 15 minutes by comparing with temporary standards made from reagent No. 4 or permanent standards made as follows:

**Cobalt Solution.**—Weigh out 24 grams of cobaltous chloride ( $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ ) and dissolve it in distilled water. Add 100 c.c. strong HCl and make up to one litre with distilled water.

**Copper Solution.**—Weigh out 12 grams of dry cupric chloride ( $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ ) and dissolve it in distilled water. Add 100 c.c. of strong HCl and make up to one liter with distilled water.

Make up standards in 100 c.c. tubes by running in the amounts of cobalt and copper solutions given in the table and filling up to the mark with water. Label each tube with its corresponding nitrate number.

C.C. Cobalt Sol.	C.C. Copper Sol.	Standard Nitrate Number.
1.1	1.1	1
3.5	3.0	3
6.0	5.0	5
8.7	6.9	7
12.5	8.0	10
20.0	8.0	15

#### NITROGEN AS NITRATES. Phenolsulphonic Acid Method.

**Reagents.**—1. Phenolsulphonic acid. Mix 30 grams of synthetic phenol with 370 grams of C.P. concentrated sulphuric acid in a round bottom flask. Put this flask in a water bath and support it in such a way that it shall be completely immersed in the water. Heat for six hours.

2. A 25 per cent solution of potassium hydrate.

3. Standard nitrate solution. Dissolve 0.72 gram of pure recrystallized potassium nitrate in one liter of distilled water. Evaporate cautiously 10 c.c. of this strong solution on the water bath. Moisten quickly and thoroughly with two c.c. of phenolsulphonic acid and dilute to one liter for the standard solution, one c.c. of which will equal 0.001 mg. of nitrogen.

**Procedure.**—Evaporate 10 c.c. of the sample in a small porcelain evaporating dish on the water bath; removing it from the bath just before it has come to dryness. Let the last few drops evaporate at room temperature in a place protected from dust. Add one c.c. of phenolsulphonic acid and rub this quickly and thoroughly over the residue with a glass rod. Add about 10 c.c. of distilled water and stir with a glass rod until mixed. Add enough of the potassium hydrate solution to render the liquid alkaline. Transfer the liquid to a 100 c.c. Nessler tube and fill to the mark with distilled water.

If nitrates are present there will be formed a yellow color. This may be compared with permanent standards made for the purpose, by putting the following quantities of the standard nitrate solution into 100 c.c. tubes and making up to the 100 c.c. mark with distilled water adding 5 c.c. of strong ammonia or potassium hydrate to each tube; namely, 0, 1, 2, 4, 7, 10, 15, 20, 25, 30, 35 and 40 c.c. These standards may be kept for several weeks.

Compare the sample treated as above described with these standards by looking down vertically through the tubes at a white surface so placed in front of a window that it will reflect the light upward through them. If the figures obtained by this comparison be divided by the number of c.c. of the samples which were evaporated, the quotient gives the number of parts per million of nitrogen in the form of nitrate.

If the color is too high to fit the standards, take an aliquot portion, dilute to 100 c.c. and compare.

**Note.**—As all permanent standards in tubes should be protected against dust and evaporation, covers made of discs of clear glass cemented on the tops of the tubes with a mixture of paraffin and bee's-wax are a great convenience. If desired, the tubes may be made with a small flat flange at the top to permit of a stronger seal.

When the chlorine content is above 30 the reduction method is recommended.

#### REDUCTION METHOD FOR NITRATES.

**Reagents.**—1. Potassium hydrate solution. Dissolve 250 grams of the hydrate in 1.25 liters of distilled water. Add several strips of aluminum foil and allow the action to proceed over night. Boil down to one liter.

2. Aluminum foil. Use strips of pure aluminum about 10 c.m. long, 6 m.m. wide and .33 m.m. thick, and weighing about 0.5 g.

**Procedure.**—Put 100 c.c. of the sample of water in a 300 c.c. casserole. Add 2 c.c. of the hydrate solution and boil down to about 20 c.c. Pour the contents of the casserole into a test tube about 6 c.m. long and 3 c.m. in diam-

eter and of approximately 100 c.c. capacity. Rinse the casserole several times with nitrogen-free water and add the rinse water to that already in the tube, thus making the contents of the tube approximately 75 c.c. Add a strip of aluminum foil. Close the tube by means of a rubber stopper through which passes a "V" shaped glass tube about 5 m.m. in diameter. Make the short end of the tube flush with the lower side of the rubber stopper, while the other end extends below the surface of distilled water contained in another test tube. This apparatus serves as a trap, through which the evolved hydrogen escapes freely. The amount of ammonia escaping into the trap is slight and may be neglected. Allow the action to proceed for a minimum period of four hours, or over night. Pour the contents of the tube into a distilling flask, dilute with 250 c.c. of ammonia-free water, distill and collect in Nessler tubes and nesslerize. When the nitrate content is high, collect the distillate in a 200 c.c. flask and nesslerize an aliquot portion. If the supernatant liquid in the reduction tube is clear and colorless, the solution may be diluted to a definite volume and an aliquot part nesslerized without distillation.

#### OXYGEN CONSUMED.

**Reagents.**—1. Concentrated C. P. sulphuric acid.

2. Standard potassium permanganate solution. Dissolve 0.3952 gram of the crystallized chemical in freshly boiled distilled water, and make up to one liter. Check against an ammonium oxalate solution. One c.c. is equivalent to 0.1 mg. of available oxygen.

3. Ammonium oxalate solution. Dissolve 0.888 gram of the substance in distilled water and make up to one liter. One c.c. is equivalent to 0.1 mg. of oxygen. Preserve with chloroform.

**Procedure.**—Measure into a flask 10 c.c. of the sewage and 90 c.c. of distilled water. Add 2 c.c. of the sulphuric acid and 10 c.c. of the permanganate solution. Place immediately in a bath of boiling water and digest for 30 minutes to the exact second. A few seconds before the expiration of the time remove the flask from the bath and exactly on the expiration of the 30 minutes run in 10 c.c. of the oxalate solution. Then titrate back with the permanganate solution to a faint but permanent pink color.

Run a blank on 90 c.c. of distilled water under precisely the same conditions and make the necessary corrections.

The amount of the permanganate used in the determination minus the blank, is the amount actually consumed by the organic matter.

If the volume of the permanganate is insufficient for complete oxidation, use a larger quantity, as it should always be in excess.

#### DISSOLVED OXYGEN.

##### Winkler Method.

**Reagents.**—1. Manganous sulphate solution. Dissolve 48 grams of manganous sulphate in 100 c.c. of distilled water.

2. Sodium hydrate and potassium iodide solution. Dissolve 36 grams of sodium hydrate and 10 grams of potassium iodide in 100 c.c. of water.

3. Sulphuric acid. Specific gravity 1.4 (dilution 1:1).

4. Sodium thiosulphate solution. Dissolve 6.2 grams of chemically pure recrystallized sodium thiosulphate in dis-

tilled water and make up to one liter. This gives a —  
40

solution, each c.c. of which is equivalent to 0.2 mg. of oxygen or 0.1395 c.c. of oxygen at 0°C. 760 mm. pressure. Inasmuch as this solution is not permanent, it should be

standardized occasionally against an —  
40

potassium bichromate as described in almost any work on volumetric analysis. The keeping qualities of the thiosulphate solution are improved by adding to each liter 5 c.c. of chloroform and 1.5 grams of ammonium carbonate before making up to the prescribed volume.

5. Starch solution. Mix a small amount of corn starch with cold water until it becomes a thin paste. Stir this into 150 to 200 times its weight of boiling water. Boil for a few minutes and preserve by adding a few drops of chloroform.

The product known as soluble starch is more convenient to use, being more easily dissolved and made up into a clear solution.

**Collection of the sample.**—The sample should be collected with the usual precaution against the entrainment or absorption of any oxygen from the atmosphere. Aspirator bottle apparatus are sometimes used, although the sample bottle may be filled with a light mineral oil and lowered beneath the surface with the stopper in place. The stopper is then removed and the sewage allowed to

fill the bottle by displacing the oil. From a running effluent a satisfactory sample may be obtained by allowing the bottle to be filled by means of a rubber tube. One end of the tube is held in the stream and the other inserted into the bottle to the bottom. The flow of liquid through the tube quickly fills the bottle and after the bottle has been allowed to overflow a few minutes the tube is slowly withdrawn, care being used to prevent any bubbles of air being caught and passed into the bottle during the filling. The bottles should hold about 250 c.c. and should have solid glass stoppers.

**Procedure.**—Remove the stopper from the bottle and add 2 c.c. or less of the manganous sulphate and an equal amount of the sodium hydrate-potassium iodide solution, delivering both of these solutions beneath the surface of the liquid by means of pipettes. Replace the stopper and mix the contents of the bottle by rapidly turning the bottle upside down several times. Allow the precipitate to settle. Remove the stopper and add about 2 c.c. of the sulphuric acid and mix thoroughly. After the precipitate is completely dissolved pipette out 200 c.c. into a flask and titrate with the N/40 sodium thiosulphate solution using a few c.c. of the starch solution toward the end of the titration. Titrate until the first disappearance of the blue color. Some analysts titrate 100 c.c. in which case an N/80 solution of sodium thiosulphate is used.

In each case the number of c.c. used gives directly the dissolved oxygen in parts per million. For accurate work, however, there are a number of corrections to be applied. (See Standard Methods.)

It is usually best to make the complete determination in the field unless the laboratory is nearby, because the titration on some sewages will not permit of being delayed even after the addition of the sulphuric acid.

#### TURBIDITY.

The simplest form of apparatus for this work is the candle turbidimeter (see Standard Methods, page 7). An incandescent electric lamp may be compared with and substituted for the candle. This is more convenient and does not heat the turbidimeter tube.

The sewage is poured into the tube until the outline of the light is indistinct. The turbidity is read directly from the graduation at the top of the liquid.

#### SEDIMENT.

A figure for sediment may be obtained by taking the difference between the turbidimeter reading of a settled sample and the reading of the same sample after shaking.

#### PUTRESCIBILITY.

Samples should be collected in well fitting glass-stoppered bottles of about 4 to 8 oz. capacity. No special precautions are necessary in collecting samples of ordinarily good effluents that are fairly high in dissolved oxygen. If the dissolved oxygen be low, precautions similar to those used in collecting dissolved oxygen samples should be observed.

A one-tenth per cent solution of methylene blue, Merck's double zinc salt, BX, is used as an indicator. One-half cubic centimeter of this solution is added to the sample and the stopper is inserted by means of a twisting motion, so as to make it tight without any bubble of air remaining in the bottle. The sample is incubated at 20° C. for fourteen days, and observations made at least once a day. As soon as the sample has become decolorized the number of days standing blue are recorded and the sample discarded. For relative stability table see "Standard Methods."

For convenience a one per cent solution of the blue may be used, in which case only one or two drops, depending on the size of the bottle, are necessary.

The medicinal form of blue may be employed, although it is not so strong in color as the dye.

#### AVAILABLE CHLORINE IN BLEACHING POWDER.

##### Titration by Sodium Arsenite (Penot).

**Reagents.**—1. Sodium Arsenite Solution. Dissolve 4.948 grams of the purest sublimed arsenious oxide in a few c.c. of strong caustic soda, acidulate slightly with HCl and add 30 grams of sodium bi-carbonate and make up to a liter. This gives a tenth normal solution.

**Note.**—Sutton in his new edition on Volumetric Analysis, p. 139, gives the following new method to which the reader is referred: Dissolve 4.948 grams of the purest sublimed arsenious oxide in about 250 c.c. of distilled water in a flask with about 20 gm. of pure sodium carbonate. The mixture needs warming and shaking for some time in order to complete the solution; when this is accomplished

the mixture is diluted somewhat, cooled, then made up to a liter.

This gives a tenth normal solution and may be checked with a tenth normal solution of iodine.

2. Iodized Starch Paper. This is made by moistening a piece of filter paper with a starch solution in which a few crystals of potassium iodide have been dissolved.

**Procedure.**—The sample is well and quickly mixed, and 7.09 grams weighed out from a stoppered test tube into a porcelain mortar, and the powder ground with successive portions of water until it is well triturated and washed into a liter flask without loss, and the mortar washed quite clean. The flask is then filled to the mark with water, well shaken and 50 c.c. of the milky liquid (= 0.3456 gm. bleaching powder), are taken out with a pipette, observing the precaution that it shall contain its proportion of the suspended matter.

This is titrated in a beaker with the tenth normal arsenious solution, until a drop of the mixture, taken out with a glass rod and brought in contact with the iodized starch paper, gives no blue stain.

Each c.c. of the arsenite used gives the percentage of available chlorine in the bleaching powder.

#### BUNSEN'S METHOD.

The chloride of lime solution prepared as above is measured into a beaker and an excess of a solution of potassium iodide added. The mixture is then diluted somewhat, acidified with acetic acid and the liberated iodine titrated with N/10 thiosulphate and starch; 1 eq. iodine so formed represents 1 eq. chlorine.

#### SOLUTIONS FOR FIELD WORK.

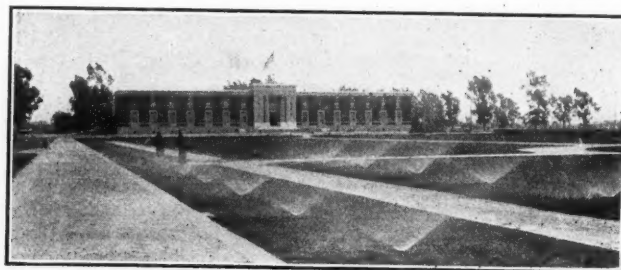
For titrating solutions of bleach at disinfecting plants, it is more convenient to have the solutions of arsenite or thiosulphate of such a strength that 1 c.c. will be exactly equivalent to a definite number of milligrams of chlorine. For example: if 1.3944 gm. of  $As_2O_3$  per liter are made up according to the method given above, one c.c. of the solution will be equal to one milligram of chlorine. With such a solution the calculations are simpler and more quickly made.

In place of the iodized starch paper, large drops of the iodized starch solution may be placed separately upon a piece of clean porcelain or white glass. These are touched in succession with the stirring rod as the titration proceeds. As soon as a spot fails to turn blue the end-point has been reached.

If preferred, toward the end of the titration, which may be done in a porcelain dish, a drop or two of the iodized starch solution may be added to the contents, causing a pale blue color, which disappears as soon as the end point is reached.

#### HIDDEN SPRINKLERS FOR PARKS.

A system of buried sprinklers is being installed in all the Los Angeles city parks where new lawns have to be put in. These consist of long stretches of pipe with sprinklers every few feet, so that when the water is turned on the whole lawn can be watered at one time



SPRINKLING FROM UNDERGROUND PIPES, LOS ANGELES.

without the constant services of a man. Under the old system the attendant was often kept busy all day changing from one connection to another several lengths of hose, which carried sprinkling devices.

This system is found to be very economical, for the ground can be thoroughly soaked in less time, and more uniformly, no bit of ground being watered twice, thus saving on the water supply.

# Municipal Journal

Published Weekly at  
50 Union Square (Fourth Ave. and 17th St.), New York  
By Municipal Journal and Engineer, Inc.  
Telephone, 2805 Stuyvesant, New York  
Western Office 608 S. Dearborn Street, Chicago

S. W. HUME, President  
J. T. MORRIS, Treas. and Mgr. A. PRESCOTT FOLWELL, Secretary  
C. A. DICKENS, Western Manager  
A. PRESCOTT FOLWELL, Editor

Subscription Rates  
United States and possessions, Mexico, Cuba.....\$3.00 per year  
All other countries..... 4.00 per year  
Entered as second-class matter, January 3, 1906, at the Post Office at New York, N. Y., under the Act of Congress of March 3, 1879.

## CHANGE OF ADDRESS

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Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for.

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NOVEMBER, 19, 1914.

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### Study Sewage Plant Operation.

The formation of scum and frothing, offensive and poorly digested sludge, accumulation of sediment in distributing channels—these are some of the difficulties to be met by superintendents of modern sewage treatment plants. It is the object of two articles in this issue to offer suggestions as to the probable causes of these and methods of preventing them.

To a large extent most troubles with sewage plants can be avoided by careful and intelligent operation; but certain difficulties cannot be remedied because of improper design, and others could be remedied or prevented much more easily had certain details been differently constructed. Too few designing engineers have any first-hand or even second or third-hand knowledge of how plants such as they design actually operate, and the future development of sewage disposal in this country along scientific rather than guess-work lines demands a more general study of operation by our designing engineers.

We have several times asked engineers what results were being given by certain features of plants built by them two or three years previous, to receive the reply: "I have not seen the plant since it was put into operation, but have received no complaints, so suppose it is working all right." It would, of course, cost an engineer time and money to visit occasionally each of the several plants which he has designed in the past; but it is part of his

duty to himself and to his present and future clients to discover any past mistakes so that he may avoid repeating them; and about the only way to do so is to keep in touch with the operation of all his own plants, certainly, and as many more as possible.

In England and Germany most plants are under the immediate supervision of intelligent men, and engineers of wide experience have a general oversight over them. But there are, unfortunately, few plants in this country which receive any supervision whatever from experts; in fact, in the majority of cases, the only man in charge never saw another disposal plant and sees his own far too seldom.

It is perhaps too much to hope that cities will voluntarily reform in this respect, since it makes little difference to them what sort of an effluent is turned out. But there should be power with the state boards of health to require them to employ competent superintendents and produce satisfactory effluents and avoid creating a nuisance. Perhaps the boards might also require all contracts for design to provide that the designing engineer take charge of the operation for, say two years after construction, his instructions to be followed by the city but subject to the general supervision of the board. But whatever the inducement, our plants should be operated with more thought and intelligence, and designers of them should acquire a more intimate knowledge of details of their operation.

### Bonds for Road Improvements.

In a recent article in the Bond Buyer, Charles F. Cushman, manager of the Municipal Bond Department of the New York Life Insurance Company, makes an urgent plea that the American Road Congress held in Atlanta last week "exert its powerful influence toward enactment into law of such financial scheme in road construction as will require the issuance of bonds payable in annual installments of principal, the final payment not to extend beyond the probable life of the improvement." In this article he makes it plain that he has in mind not only state and county highways, but also city streets and possibly other public improvements as well.

In supporting this idea, he refers to the fact that Massachusetts has recently enacted a law prohibiting municipalities from issuing bonds in any other than serial form, and limiting the life of bonds for road improvements as follows:

"For the original construction of streets or highways or the extension or widening of streets or highways, including land damages and the cost of pavements and sidewalks laid at the time of said construction, ten years.

"For the construction of stone block, brick or other permanent pavement of similar lasting character, ten years.

"For macadam pavement under specifications approved by the Massachusetts Highway Commission, five years."

As previously stated by us, New York City has heretofore issued fifty-year bonds for general municipal purposes, but the Board of Estimate recently adopted a resolution "that improvements authorized by the city during 1915 which are not self-sustaining are to be paid for, one-quarter from taxes and three-quarters by the issue of fifteen-year corporate stock. The improvements authorized during 1916 will be paid for, one-half from the tax budget the following year and one-half by the sale of corporate stock. In 1917 they will be taken care of by the payment of three-quarters from the budget and one-quarter by the issuance of bonds. All improvements made in 1918 will be met from taxes.

"The foregoing statement of policy contemplates the financing of improvements authorized during the year

1918 and subsequent years through the inclusion of the entire cost thereof in the annual budget of the city, except the revenue-producing improvements as heretofore defined."

In order to show the advantage to municipalities of the serial bonds as compared to sinking fund bonds, Mr. Cushman presents two tables, one showing the payment by years and the total payment on \$100,000 borrowed on the ten-year serial basis at 5 per cent; the other giving the payments on the same amount of 5 per cent bonds where a sinking fund is accumulated drawing 4 per cent compound interest.

One hundred thousand dollars 5 per cent bonds, payable in ten equal annual installments:

Year.	Amount outstanding. principal	Principal retired.	Interest paid.	Combined pay- ment, principal and interest.
1.....	\$100,000	\$10,000	\$5,000	\$15,000
2.....	90,000	10,000	4,500	14,500
3.....	80,000	10,000	4,000	14,000
4.....	70,000	10,000	3,500	13,500
5.....	60,000	10,000	3,000	13,000
6.....	50,000	10,000	2,500	12,500
7.....	40,000	10,000	2,000	12,000
8.....	30,000	10,000	1,500	11,500
9.....	20,000	10,000	1,000	11,000
10.....	10,000	10,000	500	10,500
Grand totals...		\$100,000	\$27,500	\$127,500

One hundred thousand dollars 5 per cent bonds, payable at the end of ten, twenty or thirty years, respectively, with amount of sinking fund payments at end of each term, amount with interest compounded at 4 per cent, to the principal sum at maturity:

Life bonds,	Annual sink- ing fund year. payment.	Annual interest.	Total annual sinking fund and interest.	Grand total.
10.....	\$8,329.10	\$5,000	\$13,329.10	\$133,291
20.....	3,358.20	5,000	8,358.20	167,164
30.....	1,783.00	5,000	6,783.00	203,490

## SANITARY POLICY FOR RACINE

### Recommended Solution of Sewerage and Water Supply Problems of a Great Lake City—Progressive Development Covering Four Years.

The city of Racine, Wis., over a year ago employed John W. Alvord to recommend to it a policy to be followed in connection with its sewerage and water supply. The study of the problem, in which Mr. Alvord was assisted by Edward Bartow, director of the Illinois State Water Survey, occupied most of the year 1913, and a report has recently been made to the city giving the method and results of the investigation and the recommendations of the consulting engineer.

The report outlined six different policies, either of which might be pursued, but one of which was recommended; it also outlined four different projects under which this policy could be carried out, and one of these four similarly was recommended. The problems at Racine are common to many lake cities which are similarly situated at the mouth of a river and which draw their water supplies from inlets in the lake.

Investigation disclosed that the water supply, which is drawn from the lake, is threatened and occasionally polluted by the sewage from the city which is discharged into Root river, which in turn discharges in to the lake. Pollution was found to exist for about two and a half miles from the shore, although the distance is variable, depending upon the influence of winds, lake drift, the volume of flow in the river and the effect of severe storms.

It was stated that there were three general methods available for protecting the water supply—treating the

sewage or the water or both; separating the sewage outfall and water inlet by a sufficient distance, or providing that extended time intervene between water inlet and sewage outfall. The methods studied comprised flushing the river and harbor into the lake and obtaining the water supply from filtered inland sources; flushing into the lake and using lake water taken approximately four miles from the harbor mouth, a sterilizing plant being installed there; retaining the present water works intake and pumping the sewage of the city seven and a half miles into the Des Plaines river valley and treating it there; or treating the dry weather sewage at an inland point and returning the effluent to Root river, also extending the water works intake two and a half miles into the lake; or intercepting and treating both dry weather and storm water flow; or finally, to intercept only the normal or dry weather sewage flow, leading it inland to be treated and returning the effluent to the Root river, thus abating the harbor nuisance, and to provide a water filtration plant to protect the water supply. The last is recommended as being both the wisest and most economical and also as a plan which can be most easily adopted and carried out progressively.

In carrying out this sixth plan, four projects were studied, and the one recommended calls for intercepting sewers along the lake shore and across the western part of the city, diverting the dry weather flow to a sewage disposal site well outside the present population area in the Root river valley, combined with filtration of the water.

Not only does the report describe in outline the complete plan to be followed, but also recommends a progressive installation, under which during 1915 the water filtration plant would be built at an estimated cost of \$115,000, and land purchased for the sewage disposal system at an estimated cost of \$30,000; also one of the intercepting sewers built at a cost of \$101,430. In 1916 a high lever interceptor would be built at a cost of \$164,370, and the sewage disposal plant at a cost of \$385,290; while in 1917 a remaining interceptor would be built at a cost of \$115,800. This gives a total cost during the next three years of \$946,890. Between 1920 and 1925 it is anticipated that extensions to all of these units will be necessary in order to adapt them to an estimated population of 85,000, the extensions at that time bringing the total cost up to slightly under one and a half million dollars.

The water filtration plant recommended is of the mechanical type designed to filter and sterilize at least six million gallons of lake water daily. The sewage collected by the intercepting sewer system would consist of the normal or dry weather flow, which would be raised by electric pumps and delivered to the disposal plant. For this plant it is recommended that an area of not less than twenty-five acres be purchased. The plant itself is recommended to consist essentially of screens, tanks, dosing contact beds and sprinkling filters, the first installation having a capacity of ten million gallons a day.

The fact that the water supply of Racine is not owned by the city but by a private corporation should, it appeared to the consulting engineer, have no effect upon the decision as to the proper sanitary policy to adopt. "State regulation insures that a fair return be received on the value of the property devoted to public use; and if filtration of the water supply is indicated as necessary and desirable as the result of a general study, the city will pay return on its cost in either case (whether the city or a private company operates it); and if water filtration is found more economical and safe than some other plan, the city will be the beneficiary of that economy, whoever owns the plant."

**UNDERGROUND INFORMATION FOR BIDDERS.**

In his report for the year 1913 on the sewerage system of Baltimore, Md., now nearly completed at a cost of \$20,000,000, Calvin W. Hendrick, the chief engineer, discusses as follows the policy of giving to bidders on sewerage work as much information as possible on underground conditions which they will encounter:

"On account of the lack of information regarding underground structures, the very extensive ramifications of the sewerage system, the effort to interfere as little as possible with existing structures, and in order to give the contractor as much information as possible in making his bid, we have necessarily had to make extensive investigations of the records of all the city departments and public service corporations; and, in addition, sink numerous test-pits. This has resulted in adding to our engineering cost, but it has been the means of effecting large savings to the city, by the contractors giving lower prices on account of having this information, and will result in the city having one of the most complete underground maps of any city in the country. It has also enabled us to do our work with the least possible interference with the structures of other city departments and public service corporations. This has involved, since the beginning of the work, the preparation of 10,500 drawings. Included in this number are 107 record plots which have been entirely completed, and 383 partially completed. These plots, which form the foundation of our contract drawings, show street, lot and curb lines, existing sewers and drains, tracks, pipes and other structures, with depths, sizes and materials. . . .

"In planning and executing such work as the Baltimore sewerage system, either one of two diametrically opposed policies may be followed:

"First—The plans and preliminary investigations may be of the most general character, leaving it to the contractor to make detailed investigations and to assume all risks of unknown conditions. If this plan is followed the contractor's prices are necessarily high, in order to cover contingencies.

"Second—The plans and preliminary studies may be made in great detail, showing, so far as possible, all underground conditions and obstructions, and leaving as few things as possible to be covered by the contractor's allowance for contingencies. This method results in the lowest prices from the contractors and has been adopted by the Sewerage Commission, with the result that we have secured very wide competition and generally low prices on all of the work which has been done. The saving secured by the lower prices has been many times greater than the additional cost of preparing the plans along the above lines.

"The use of photography was introduced in the Sewerage Commission's work from the very start and has resulted in producing evidence that has thwarted a great many law-suits and enabled the city to win many others. Our method has been to carefully examine buildings before our work was started, and in the case of any defects, have them photographed; also, elevations taken on curbs and sills. While this has added to the first cost, it has, as stated above, enabled us to save large sums to the city."

**COST OF ENGINEERING IN SALT LAKE.**

In the report for 1913 of Sylvester Cannon, city engineer of Salt Lake City, Utah, the expenses of his department are given in great detail, itemized both as to the nature and amount of each disbursement and also distributed among a considerable number of subdivisions

of work accomplished. The items include not only the payroll of the department, but also all expenditures for stationery, instruments and other materials.

One interesting statement is that showing what percentage of the cost of the various classes of construction work supervised by the engineering department was charged up for engineering and inspection, this including, as stated, materials as well as salaries and wages. The contract work under the head of "paving extensions" amounted to \$207,612, and the cost of the engineering of this was 5.32 per cent of the contract cost, the cost of inspection 2.62 per cent, and that of advertising was 0.30 per cent. The sidewalk extension work totaled \$77,350, and the percentages of this for engineering, inspection and advertising were 10.57, 1.70 and 1.15 respectively. For curb and gutter extensions there was spent under contract \$118,944, and the engineering, inspection and advertising costs were 6.73, 1.61 and 0.35 respectively. The cost of these items on sewer extensions, the contracts for which totaled \$80,264, were 4.52, 4.52 and 1.22 per cent respectively.

**ECONOMICS OF SEWAGE FILTERS\***

**Sand, Contact and Sprinkling Filters—Population Per Acre of Filter Practicable—Cost Per Acre and Per Capita—Economical Depth.**

The output of a filter of any type depends upon the nature of the sewage, the nature and fineness or coarseness of the filtering material, the method of application of the sewage to the filtering material, temperature, atmospheric conditions and many other factors. The intermittent sand filter is best for obtaining a very high degree of purification; contact filters, sprinkling filters and others are used for a less degree of purification. By using a suitable rate under suitable conditions, however, any type of filter can be made to give any degree of organic purification that may be desired within the limitations of the type in question.

**RATE OF FILTERING SETTLED SEWAGE.**

*Sand filters.*—The question of the rate of application of the sewage to a sand filter is largely tied up with that of preliminary treatment by tanks or screens. The following table gives figures for each of several Massachusetts cities, showing the time of detention in sedimentation tanks, storage wells, pump wells or other kinds of storage, and the population whose sewage can be treated per acre of filter. The average of these shows that with 6.7 hours of detention previous to filtering, the sewage from 937 persons can be treated on one acre of filter. The Baltimore sewerage commission in 1906 estimated that sewage which had settled six hours could be treated on a sand filter containing 3 feet of clean sand at the rate of 1,200 people per acre.

	Period of Detention.	
	Hours.	Population.
Andover .....	1½-3	950
Brockton .....	12	1,160
Clinton .....	12	425
Framingham .....	12	375
Gardner (Old) .....	1½	1,310
Gardner (New) .....	1½	2,000
Pittsfield .....	12	605
Stockbridge .....	8	220
Worcester .....	1½	1,390
Average of all.....	6.7	937

*Contact filters.*—American data for contact filters are

\*Abstract of a paper by George W. Fuller, before the American Society of Municipal Improvements.

relatively few, and the use of English data is rather dangerous owing to the difference in strength of English and American sewage. Experiments at Columbus, Ohio, indicated that contact filters containing 5 feet of stone could be safely operated at an average rate of 600,000 to 700,000 gallons per acre per day; or 500 gallons for a 4-foot depth, equivalent to about 5,000 people per acre. Tests at Lawrence, Mass., on beds of various depth gave an average of about 700,000 gallons per acre for a depth of 5½ feet, equivalent to about 135 gallons per acre for each foot of depth of stone, or again about 5,000 people per acre of 4-foot bed. Contact filters 4½ feet deep covering 3.6 acres at Plainfield, N. J., treated an average of 1.7 million gallons per day in 1910, equivalent to the sewage from 4,200 people per acre of 4-foot bed.

*Sprinkling Filters.*—For sprinkling filters much more satisfactory data can be had, and their ratings can be fixed with much more dependence. The depth and population per acre of several such filters in this country are as follows: Reading, 5 feet, 18,000; Columbus, 5 feet, 18,000; Atlanta, 6 feet, 20,000; Philadelphia, 6 feet, 20,000; Montclair, 7½ feet, 15,000; Mt. Vernon, 8 feet, 24,000; Baltimore, 9 feet, 20,000; Fitchburg, 10 feet, 50,000. The average of all these is a 7-foot bed with 19,400 population per acre.

For ordinary conditions we may safely assume the following averages: Intermittent sand filters, 3-foot bed of sand, 1,000 per acre. Contact filters, 4-foot depth of stone, 5,000 per acre. Sprinkling filters, 7-foot depth of stone, 19,000 per acre.

#### COST OF SEWAGE FILTERS.

Costs of construction are so much affected by local conditions, such as amount of excavation necessary, cost of materials and distance to be transported, etc., that comparative costs for different localities are to be used only with great discretion, and averages should be used only as a guide to comparative costs in various places. The average cost of the nine Massachusetts intermittent sand filters cited above was \$3,260 per acre, or \$3.50 per capita using the filters. The Baltimore sewerage commission estimated the cost per acre at \$6,350, corresponding to \$5.30 per capita.

The cost of contact filters equipped with suitable convenient appurtenances may be taken at about \$30,000 per acre for a bed 4 feet deep, or \$6 per capita.

For sprinkling filters 7 feet deep the cost will be about \$45,000 per acre, or \$2.37 per capita.

The relatively low cost of the Massachusetts sand filters, as compared with the Baltimore estimate, is due to the fact that conditions in that section of the country are unusually favorable for such filters. In most cases the costs would more nearly approximate the Baltimore estimate. It appears from this that the cost per capita of intermittent sand filters and contact filters do not differ greatly, and that sprinkling filters are a far more economical installation in the matter of first cost.

*Depth of Filters.*—The cost of filters will, of course, vary with the depth, but little is known about the relative advantages of shallow or deep filters. Very few tests have been made which give convincing information as to the most economical depth for securing a given degree of purification. In some places filters are made 10 feet, in others 6, and it is certainly worth while to determine which would be the better. In the following comparison it will be assumed that sufficient head is available for any depth adopted without adding to any pumping cost.

This question does not arise for intermittent sand filters, as these are not usually made more than 4 or 5 feet deep, and in general any amount over 3 feet is added merely to increase the number of times that the clogged

sand surface can be removed before the entire reconstruction of the bed becomes necessary.

In the case of contact filters, where the amount of air drawn in between fillings is practically equal to the volume of the sewage and where surface clogging cannot be a serious factor, each cubic yard of stone forming the filter will give the same output of purification regardless of the depth of the filter. It would therefore appear that it is economical to build a contact filter as deep as local conditions of construction will permit, and the question of economy is therefore one of minimum total cost of constructing a containing basin for a given number of cubic yards of stone.

For sprinkling filters the problem is more complicated. The Royal Commission reported that English practice seems to indicate that the output per unit of volume is the same regardless of the depth; but American experiments do not wholly corroborate this. Our best knowledge seems to indicate that the output per unit of volume is somewhat less for deep than for shallow filters. Therefore, with a relatively decreasing efficiency of the stone as the depth increases, and at the same time a relatively decreasing cost for construction per unit of volume of stone, there must be some point where the greatest output per unit cost of stone will be obtained. Baltimore Sewerage Commission in 1911 estimated, from tests made in Baltimore, that the relation between depth and results would be as follows:

	6 ft.	9 ft.	12 ft.
Relative stability .....	79	87	89
Per cent reduction of oxygen consumed.	56	70	72

Giving equal weight to the relative stability and per cent reduction of oxygen consumed, we get the following:

	6 ft.	9 ft.	12 ft.
Relative stability .....	1	1.2	1.23
Per cent reduction of oxygen consumed.	1	1.25	1.28
Average of the two.....	1	1.22	1.25
Relative depths .....	1	1.33	2.00
Relative value of stone per cubic yard...	1	.92	.63

Assuming this depth varies at a uniform rate from one end of the curve to the other, we get the following for the relative value of stone per cubic yard:

	6 ft.	7 ft.	8 ft.	9 ft.	10 ft.	12 ft.
Depth of bed.....						
Relative value of stone per cubic yard.....	1.0	0.97	0.94	0.92	0.82	0.63

To get comparative figures then between the 6, 8 and 10-foot beds, the cost figures for the 8-foot beds must be divided by 0.94, and the cost for the 10-foot beds by 0.82, putting them all on the basis of the 6-foot beds.

For comparative cost a number of factors such as excavation, etc., are naturally omitted, as they are not affected in all places the same way by the depth of the filter. Comparing, then, only those particular costs which are affected per unit of output by the depth of the filter, we get the following:

	Cost per effective cu.yd.		
	Depths.		
	6 ft.	7 ft.	8 ft.
Floor. Take at 0.40 per cubic yard for a 6-foot bed.....	\$0.40	\$0.35	\$0.32
Tile. Take 11c. per square foot for any depth .....	.49	.44	.40
Walls. Assume cost 0.17 per cubic yard for 6-foot depth.....	.17	.17	.18
Galleries and Collectors. Assume for 6-foot depth 0.25 per cubic yard....	.25	.22	.20
Distribution. Assume 0.50 per cubic yard for 6-foot depth; also, as costs theoretically vary only according to quantity delivered, they must be same for all effective depths per cubic yard .....	.50	.50	.50
Stone. Assume \$1.50 per cubic yard..	1.50	1.55	1.60
Total .....	\$3.31	\$3.23	\$3.20

Outside factors will depend on quantity only and not on depth.

It appears then, that there is some slight saving of cost, which, on the figures given in the table, amounts to about 3 per cent, in favor of the 8-foot deep bed as compared with the 6-foot deep bed. On the other hand, it is to be recognized that a deep bed will give a good deal more trouble with pooling and freezing than a shallow bed, and the advantages in favor of a shallow bed due to this lesser amount of pooling will be considerably more than this 3 per cent difference in cost. Taking everything into account, the writer believes that a sprinkling filter bed of not less than 6 feet and not more than 7 feet will, in the greater number of cases, prove the most economical to use.

NOTE.—George T. Hammond, in describing, at the same convention, the sewage treatment experimental plant in Brooklyn, stated that in this plant the sprinkling filters are so arranged that samples can be taken at depths of 6 feet, 7 feet 3 inches, and 8 feet 6 inches, and from the full depth of 10 feet; and stated that experiments so far conducted indicated that the effluent at depths below 6 feet was very little, if any, superior to that at the least depth studied, and that consequently there would seem to be little advantage in making sprinkling filter beds more than 6 feet deep. This conclusion, however, we do not understand to be final, but merely preliminary.

## CITY PRISONERS FOR PARK WORK

Experience in Springfield, Ohio, in Using Them for City Work—Little Financial Gain, But Better for the Prisoners

By GEORGE L. RINKLIFF.

The City of Springfield, Ohio, has been conducting, during the last several months, an experiment in the use of prisoners upon public work, and from the results so far obtained, it appears that the plan will work satisfactorily, providing those in charge of its execution bear in mind certain well-defined limitations.

The data at hand so far demonstrate that prisoners can be worked successfully upon certain classes of public improvements, to the advantage of both the prisoners and the public in general. It has been found, however, that this class of labor is of value only upon certain parts of the improvement and maintenance work of the city in which a small portion of the appropriations for such purposes are spent, and that the utilization of the labor of ordinary offenders against city ordinances is not likely to go far in solving the financial problems of cities.

The laws of Ohio prohibit the working of prisoners upon public thoroughfares, and for this reason the Springfield experiment is being tried in a new park site adjacent to the city prison. The result is that the city is gradually developing what was once a stone quarry and later a public dumping ground into a park of considerable natural advantages located in the heart of the city, at practically no cost whatever.

The prisoners are men who have been convicted of misdemeanors, such as disorderliness, intoxication and loitering, and the large majority of them are committed to jail on account of their inability to pay fines. In their cases, it is a choice between keeping them locked up for periods of usually less than two weeks, or of giving them work in the open air during the daytime until their fines are served out.

Eight hours constitute a working day. Only one guard is employed to look after them and while at work the prisoners are practically free men. There is no standard as to the amount of work required, it being expected merely that the prisoner shall keep at work, and he is

allowed to set his own pace. The officials in charge of the work started out with the idea that three prisoners would do about as much work in a working day as one competent laborer, and the results obtained have not exceeded this expectation in a very large degree. As a rule, however, the prisoners take a greater degree of interest in seeing something accomplished than was hoped for. In consideration of the fact that he is working, a prisoner is given more food and the advantage of being out of doors during the greater part of the day. Any prisoner with a determination to escape could easily do so, but would understand that it would be best for him not to return to the city; and so far as this class of prisoners is concerned, in the minds of the authorities and of the public generally there would be no complaint as to his escape if he were to stay away permanently.

The number of prisoners employed in the park has averaged eleven men per day during the past summer. The expense has been small, the qualifications of the man needed for guard duty being easy to fill, the extra food required for the prisoners entailing but a slight increase in the cost of their sustenance, while the equipment needed for the work requires but a small investment. However, the depreciation in equipment is considerably larger than it would be were laborers employed to do the same work, for the reason that the prisoners exercise little care regarding their tools.

Having the prisoners break rock was tried early in the summer, but was abandoned as the output did not pay expenses and the work proved too monotonous to interest the men. They have, therefore, been employed principally in levelling ground and sorting out the stone from the other debris in the old quarry site. As a result, the park area is being gradually made as smooth as a lawn, and a large quantity of stone is being acquired, which can be crushed and used in the construction of drives in the park. When the crusher is put to work in the park, the prisoners will be employed to feed the machine and distribute the broken stone over the roadways in wheel-barrows.

The average municipal public improvement requires the employment of men who have some experience in or fitness for the work, and the police court seldom sentences laborers with any marked qualifications for street repairing and similar employment, neither is the supply from that source dependable; while the public usually expects that such work will be completed as expeditiously as possible, and the tax-payer would rather see his money go for the employment of laborers than of guards.

It appears, judging from the experience in Springfield, that it is advisable to use prison labor only for work which otherwise would not be done at all, the nature of which is such as to require little supervision and the investment of only a slight amount of capital, and of which there is no need for prompt completion.

## DISAPPEARING SAFETY SIGNS FOR DETROIT.

The Police Department has presented a project for the establishment of disappearing safety zone posts, that would be in the shape of iron standards carrying a marker upon which the words "Safety Zone" would be written. The posts are to be embedded in the streets fitting in an iron casing in which they would be locked up at night. They could be raised and lowered by the traffic officers and will have chains attached to them to mark off the street car stopping zones. The advantage of such posts will be to leave the streets entirely free for parades or any special events and would also do away with the suggested platforms. If desired, a light could be provided for the posts.

# The WEEK'S NEWS

Street Tearing Stopped in Boston—First Concrete Roads in Minnesota—Street Work in Macon, Ga., and Steelton, Pa.—Sanitary Inspection of Industries in New York—Segment Sewer for Bridgeport, Conn.—New Reservoirs for Pittsburgh and Atlantic City—New York City Police—New Motor Apparatus—Commission Government in Kentucky and New York State—Toledo's New Charter—Richmond, Va., Doubles Size—Philadelphia's Bonds—Fares in Massachusetts.

## ROADS AND PAVEMENTS

### To Stop Street Tearing.

Boston, Mass.—City Council has adopted a plan for stopping indiscriminate laying of conduits or tracks by the public service corporations, with their consequent ripping up of the streets. In hundreds of instances expensive street surfaces have been laid, only to be dug up for long stretches by the corporations, when, had a definite policy of coordination been in force, all this work would have been completed at the same time. Theoretically, the corporations have been obliged to put the streets back into as good condition as they found them, but there is abundant testimony that the streets never look the same, especially the smooth surfaces, when the corporations get through with them. Corporations must act with the street department hereafter.

### Concrete Roads in Minnesota.

Winona, Minn.—The first three concrete roads in Winona County have been declared finished and accepted by State Engineer George W. Cooley, Deputy Engineer John M. Mullen and District Engineer H. B. Childs of the State Highway Commission and the Winona Board of Commissioners. The three roads, No. 1, leading down to La Moille; No. 2, in East Burns valley, and No. 3, over Stockton hill—to the east, south and west of Winona city—were constructed under the provisions of the Elwell road-making law. It is claimed that Winona County has the first system of concrete roads in Minnesota. The three roads cost approximately \$144,000, an average of \$9,000 a mile. The East Burns and the Stockton roads each are four and one-half miles in length, and the La Moille road seven and three-tenths miles long, making an aggregate of over sixteen miles. The work of construction began in August, 1912, under the direction of the contracting firm of Prinz & Carlson. They completed half of the job when the contract was relet to Hanlon & Okes, who completed the jobs.

The La Moille and East Burns highways each have a center of concrete eight feet wide, and on either side is a four-foot shoulder of crushed rock or gravel. In the Stockton highway, however, the eight feet of concrete is built close to the hill and the eight-foot shoulder skirts the outside. This road leads over what was a dangerous highway, at places looking down into a ravine. In widening steam shovels removed 14,000 yards of dirt and rock from the bluff side of this highway.

### Exhibit Model of Road.

Syracuse, N. Y.—The topographical reproduction in wood and papier mache of Storm King Mountain on the Hudson River has been completed. The model, made on a scale of twenty feet to the inch, is designed to show a section of the proposed state highway to be built along the precipitous mountain side between Cornwall Landing and West Point, which, when completed, will be an engineering feat. The miniature mountain in nine sections has been shipped to Atlanta, Ga., where it has formed the principal exhibit of the New York State Highway Department at the American Good Roads Congress. The model was accompanied to Atlanta by S. L. Adcock and C. H. Mattison, civil engineers attached to the state highway offices in this city, who constructed it. The model is twenty feet long, exclusive of the scenic wings, and nine feet high and copies the full effect of the road.

Storm King at its highest point is 1,360 feet above the Hudson river. The fact that the West Shore tracks are at the foot of the mountain will add to the difficulty in

constructing the highway, which will be 400 feet above the river at the highest point. Blasting on an extensive scale cannot be depended on to cut a road in the solid rock on account of the danger of precipitating huge blocks of granite on the railroad tracks below. Work will begin at one end and all the rock dislodged by means of small charges of dynamite must be carted away. The state intends to build the highway in the immediate future. With the greatest difficulty owing to the precipitous side of the mountain, surveys have been made, and contracts will be ready for bidders as soon as negotiations for rights of way are completed. The total cost is estimated at \$500,000.

### Street Work in Macon, Ga.

Macon, Ga.—City Engineer J. J. Gaillard reports that Macon has just finished this year 600 linear feet of concrete pavement 8 inches thick, 40 feet wide, 1:2:3 mixture, using Portland cement, clean, coarse, sharp sand and hard crushed granite 1½ inches down. This street cost \$1.41 per square yard. Another street was laid 2,200 feet long and 40 feet wide under the same specifications and 8 inches thick at a cost of \$1.39 per square yard, 1,200 linear feet 21 feet wide similar to this at a cost of \$1.40 per square yard, 600 linear feet 52 feet wide and 8 inches thick, at \$1.33. All of this was done with city's own force. Last year and year before last 4,300 linear feet 40 feet wide were laid at a cost of \$1.40 per square yard, the last being done by contract. On all this work were placed one-half inch expansion joints along the curbing and a thin transverse expansion joint every 25 feet. In 1912 and 1913 alleys were laid in the business portion of town with concrete, the 20 feet alleys being 8 inches thick and the 10 feet alleys 6 inches thick, using a mixture of 1:2:4. The alleys were laid by contract, \$1.08 per square yard for the 6 inches and \$1.27 for the 8 inches. All this paving is still in perfect condition.

### Contractor Must Pay for Inferior Paving.

Fond du Lac, Wis.—The city of Fond du Lac has secured a verdict of \$13,000 against E. H. Lyons and J. P. Connell, bondsmen of the McCugo Construction Co., which paved two streets and guaranteed the paving for five years, the court finding the brick of inferior quality. It is the first time in Wisconsin that a contractor or bondsman has been sued to make good a five-year guarantee.

### Course for County Road Engineers.

Lexington, Ky.—Prof. D. V. Terrell, of the College of Civil Engineering at State University, has just sent out letters to the county road engineers of this state in regard to the short course in highway engineering, January 4 to 16. Professor Terrell states that the new laboratory for testing road materials, has just been installed at the university. This laboratory is a duplicate of the one used by the United States Department of Public Roads, and is said to be very efficient in determining the relative strength of road materials and their wearing qualities.

### Paving Completed.

Steelton, Pa.—The borough's biggest public improvement project has been realized with the completion of about 20,000 square yards of paving by the Standard Bitulithic Company. This amount and nearly an equal number of yards completed by the Central Construction & Supply Company some time ago, comprises the paving provided in the \$55,000 improvement loan voted by the people a year ago. The amount of money set apart for paving and improvement to the water system amounted to \$35,000.

### To Experiment with "Durax."

Montevideo, Uruguay.—An experiment is to be made in

Montevideo with the Durax system of street paving. A contract has been closed for laying 5,000 square meters of the paving in the city. The materials required are about to be shipped from Norway.

## SEWERAGE AND SANITATION

### Sanitary Inspection of Industries.

New York, N. Y.—Health Commissioner Goldwater has announced that the Health Department has made plans providing for a sanitary inspection of every factory and workshop in the city. Facts thus gathered will be turned over to employers and workers, who will then know what ought to be done to better conditions. The Department of Health is prepared to undertake the sanitary survey of any industry, trade, or group of manufacturing establishments in the city with the view of ascertaining conditions and trying to show what can be accomplished through a system of voluntary sanitary control. Through its Bureau of Public Health the department will assist in formulating sanitary industrial standards for the prevention of occupational diseases. The movement is the outgrowth of the garment workers' strike of four years ago, when it was ruled that every industry shall be responsible for the sanitary conditions in that industry.

### Police Fight Diphtheria.

Jersey City, N. J.—Dr. Frank Edsall, Superintendent of Health, has enlisted the aid of the police in his efforts to stamp out diphtheria in the city. There are at present nine known diphtheria cases in Jersey City, and all have been put under rigid quarantine. Health officers are keeping a strict watch for further signs of an outbreak, and every effort is being made to avoid a recurrence of the epidemic which swept the city six months ago. Whole families are being immunized against the disease. In every police station supplies of antitoxin are held in readiness for instant use, and physicians throughout the city are instructed to notify the police of every case or suspected case discovered. In the nine cases already reported the houses have been fumigated, families immunized, and a police guard established at the doors to keep all visitors away. The quarantine is the strictest ever enforced in Jersey City.

### Claims from Water Company for Typhoid.

Trenton, N. J.—The liability of a water company to its patrons to pay damages for typhoid fever which may be caused by germs in the water supply, is involved in the appeal in the suit against the Mount Holly Water Company, which was argued before the Supreme Court. After hearing the argument the court reserved decision. The complainant and his family were consumers of water sup-

plied by the defendant company, and in January, 1912, three of his children were stricken with typhoid fever. The plaintiff claimed that the water was of such a character that it caused the typhoid and he brought this suit to recover damages from the company. The case was tried before Judge Lloyd in the Burlington County Court, and the jury gave a verdict for \$711. The company then took this appeal to the Supreme Court.

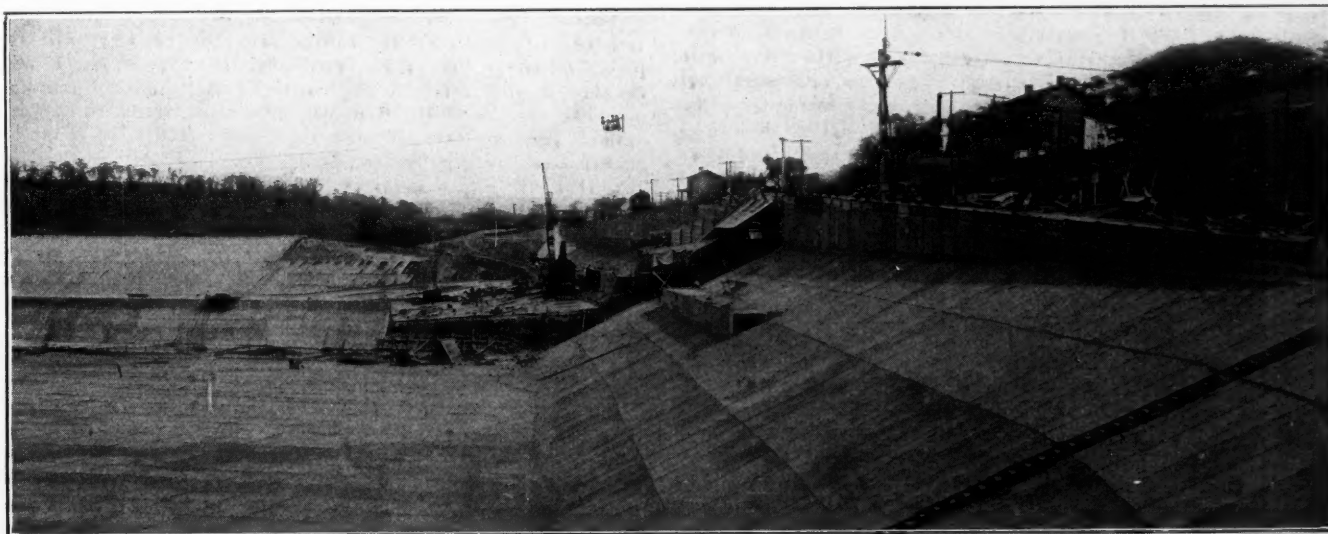
## WATER SUPPLY

### New Reservoir Completed.

Pittsburgh, Pa.—Water has been turned into the new Cabbage Hill reservoir, which is here illustrated, for the North Side, Pittsburgh. Engineers from various parts of the United States have been guests of the city recently, having made the journey to this city to inspect the new plant. Water has been turned into the supply mains, after having settled thoroughly. Mayor Joseph G. Armstrong, members of Council, Director Robert Swan of the Department of Public Works, City Clerk E. J. Martin, Superintendent Charles A. Finley of the Bureau of Water, Contractor John F. Casey, E. E. Lampher, division superintendent, and John F. Cole, field engineer, examined the new reservoir. In connection with Highland Reservoir No. 2, the Cabbage Hill basin will, by means of the 48-inch steel main being constructed under the Allegheny River furnish water to the North Side and low-lying sections of old Pittsburgh, including the South Side and West End. The Cabbage Hill Reservoir has a capacity of 160,000,000 gallons, and Highland Reservoir No. 2, 130,000,000 gallons. These two basins will give a supply of practically 300,000,000 gallons, and as the North Side requires but 35,000,000 gallons daily, and the low-lying sections of old Pittsburgh only 40,000,000, the two basins will hold sufficient water to supply the sections four days. The water which is to supply the Cabbage Hill Reservoir will be pumped from the filtration beds at Aspinwall through the new Aspinwall pumping station. The contract for the new reservoir was awarded July 6, 1912, at \$683,976.

### City Wins in Water Suit.

New York, N. Y.—Corporation Counsel Frank L. Polk has secured a victory for the city, in a decision handed down by the Appellate Division, in Brooklyn, in the litigation involving the construction and effect of the emergency contracts made by the city officials with the local water supply companies for partial supplies of water for different sections of the Borough of Queens. The Urban Water Supply Company obtained one of these contracts during the administration of Mayor Gaynor, and secretly filed an amended certificate of incorporation reciting such contract and giving the City of New York as the addi-



Courtesy Pittsburgh (Pa.) Dispatch.

PITTSBURGH'S NEW RESERVOIR.

tional territory in which it claimed the franchise power and duty, by virtue of the contract, to go into the business of supplying water to the entire city. After the expiration of its contract last year it made various attempts to secure a renewal of the municipal patronage, but failing in this, it sought to compel Borough President Connolly, by mandamus, to issue permits to it to lay its water mains in Long Island City for the purpose of supplying the inhabitants with water, claiming it had secured a franchise to do so from the State.

The Supreme Court decided that the company had secured no such franchise, and denied its motion for a mandamus. On appeal the Appellate Division has just sustained the ruling. The questions decided in this case affect all the many similar contracts made with the local water supply companies for an emergency supply of water. No one of them can now claim a franchise power or right over the whole of the Greater City, and the administration has, in this victory, saved many millions of dollars which would have had to be paid to condemn the claimed additional franchises. Had the contentions of Mr. Polk not been upheld in the courts, the city would have had private water supply companies claiming the right to compete with it in furnishing water.

#### Begin Work on New Reservoir.

Atlantic City, N. J.—Work has been started on a \$200,000 concrete reservoir by the Bader Construction Company of Atlantic City which when finished will increase the supply of water. Now Atlantic City is supplied with drinking water through a natural pond which is supplied by a number of springs. The plans and specifications call for a ten-foot high concrete wall which not only would surround the natural pond as it is now but will take in surrounding properties which have been secured by the city. The reservoir is situated about two miles above Absecon, the water is pumped from the pond to the Atlantic City Water Company's pumping station two miles from Pleasantville. T. Chalkley Hatton, of Philadelphia, is the chief engineer and W. M. Ferribee has charge of the work.

#### To Meter Whole City.

Rome, Ga.—An ordinance requiring all parties using city water to install a meter is being considered by the council. If the ordinance is passed at the second reading, the city will purchase the meters, put them in and allow the users to pay for them in installments. The meters will cost about \$12 each, and 100 meters will be put in each month. It is hoped to make such arrangements whereby the factories will give Rome the privilege of paying for the meters as they collect from water consumers. It is estimated that it will take \$30,000 to purchase meters for every house and store in the city. The object of requiring the meters installed is to stop the waste of water. All fire hydrants and sprinklers used by private parties outside of the city limits will have to pay \$10 for the privilege and \$10 additional when they are used for the first time, an ordinance to this effect being passed by council Monday night. None of the hydrants or sprinklers can be used for any other purpose than for fire protection. Council learned in several cases that the hydrants were being used freely in sprinkling, and other purposes. The ordinance was passed to stop the waste of water, the city getting no revenue for the use of hydrants and sprinklers.

#### May Organize Western Water Works Men.

Salt Lake City, Utah.—Organization of a western association of waterworks superintendents is being inaugurated by Charles F. Barrett, superintendent of waterworks of Salt Lake. The organization is designed to embrace the waterworks superintendents and others interested in waterworks business of the entire West, Northwest and Southwest. The idea originated with Mr. Barrett after he had attended the annual convention of the American Waterworks Association at Philadelphia recently. He has mailed circular letters to waterworks superintendents of the West asking their opinion and an expression as to whether they would be will-

ing to help organize an association in the West. On the replies will depend further action, but Mr. Barrett believes the waterworks men of the West will be heartily in favor of a western organization. It is planned by Mr. Barrett to have the organization convention in Salt Lake next year if sufficient interest is manifested in the scheme. As explained by Mr. Barrett, it is impossible to get the American association to hold a convention in the West because the bulk of its membership is in the East and they decline to pay railroad fare to and from western points.

#### City Reduces Water Rates.

Denison, Tex.—As the result of a motion made by Mayor C. T. McElvane the users of city water in Denison will have their bills reduced, beginning with the quarter commencing November 1. The fifty-cent rate was reduced to thirty-five cents; the twenty-five-cent rate to twenty cents and the fifteen-cent rate to twelve and one-half cents.

## LIGHTING AND POWER

#### Report on Proposed Municipal Plant.

Phoenix, Ariz.—That Phoenix, by installing a municipal electric lighting plant at a cost considerably below \$60,000 and perhaps below \$50,000, can light the streets of this city at a cost of from 2.2 to 2.9 cents per kilowatt hour as compared with a rate of 5 cents now charged by the Pacific Gas and Electric Company, is the substance of a report presented to the city commission by City Electric Inspector Dodge, the result of months of research. Increased water pumping facilities are also urged. The use of a 160 h. p. Diesel engine or of a 240 h. p. Diesel engine is suggested in alternative plans.

#### Charge Inferiority of Gas.

Trenton, N. J.—Trenton has appealed to the Public Utility Commission asking that the illuminating gas supplied to the municipality by the Public Service Gas Company be investigated on the ground that numerous complaints have been filed to the effect that it is of inferior quality. The appeal was filed by City Counsel Bird, at the direction of the Commission. The request is also made that the Utility Commission direct the company to supply gas of illuminating power equal to that furnished in New York State—22-candle power. It is also set forth by the petition that the City Commission believes the Utilities Commission has power to fix a standard quality of gas other than that now established.

#### To Celebrate Dam.

Austin, Tex.—The celebration of the dam's completion and of the fifty-seventh anniversary of the city will be joint and cover four days, beginning Monday, April 12; the events of the celebration consist partly of a historical pageant of not more than six episodes, partly of aquatic sports and contests at the dam, and partly of a street carnival to occupy five days; a grand ball will be held at the Hall of Representatives the first night; a symphony concert will be given Thursday night at the city auditorium; the pageant and the ball will be pay affairs, and the other events free (excepting the street carnival). \$5,000 will probably be necessary to defray the expenses. It is planned to have present the President of the United States and three or four members of his cabinet.

#### Ask for Continuation of Supply.

Columbus, O.—Appeal has been made by the city and residents of Newark to the public utilities commission for an order compelling the Logan Natural Gas and Fuel Company and the Newark Natural Gas and Fuel Company to continue furnishing a supply of gas to the city under the franchise granted the latter company, now a subsidiary of the former, in 1898. The Logan company recently notified its subsidiary that it would discontinue furnishing it gas after November 30. The city not only requests the public

utilities commission to compel the gas companies to continue furnishing a gas supply under the franchise but also an order to compel them to extend the service, which is declared to be wholly inadequate. It is understood that the Logan company is not satisfied with the rates, though it also complains that its supply is inadequate to furnish the Newark company. The city avers that the Logan company has an adequate supply.

## FIRE AND POLICE

### Social Work for Police.

New York, N. Y.—Police Commissioner Arthur Woods has announced that he intends to make a social worker of the policeman this winter in dealing with the unemployed. Policemen will inquire into the case of every unemployed man that comes to their attention, find out what the man can do, make notes of the facts regarding the case, and bring the man into touch with some charitable organization that will endeavor to find employment for him.

Commissioner Woods said that as soon as it was possible to obtain an appropriation for the purpose, he hoped to install green signal lamps all through the city, to be lighted by a citizen or a lieutenant at a station who wanted to get in touch with a policeman.

### Vote for Firemen's Day Off.

Providence, R. I.—Five of the six cities of the state through a referendum vote have approved a law granting the members of the permanent fire department of those cities one day off in five. All adopted it by large pluralities. Cranston, which is the only city in the state that does not have a permanent fire department, did not vote upon the question.

### Instal New Fire Alarm System.

Fairfield, Conn.—The new fire alarm system will shortly be completely installed. The poles have been erected and the wiring almost finished. Towers and bells have been placed in the Stratfield and Southport districts and an automatic whistle has been installed at the Fairfield Rubber Company's plant. The whistle will serve as an alarm for the center district and will be operated by electricity. The Loper Fire Alarm Company has the contract for installation. The fire district will be mapped off into blocks and each block will be numbered. An alarm of fire will be sent in to the office of the telephone company and sounded. Each block is numbered and the whistle or bells will sound the number of the district. Signal bells will be placed in each of the engine houses. The system is being installed at a cost of \$2,500.

### To Increase Police Ratio.

Lynn, Mass.—Mayor Newhall is planning to reorganize the police force of the city if the commissioner of finance can provide the funds necessary. To bring the force up to the standard of other cities of the same size at least 10

more men will be needed. At present the patrol platoon is credited with 85 patrolmen, with 61 routes, each of which is covered by one officer, while the balance of the police are divided into house policemen and relief officers to cover routes when regular men are off duty. The mayor intends to shorten these routes. Other cities of the state provide one or more patrolmen to every 1,000 inhabitants. New Bedford, with a population of 110,000, has a patrol force of 127. Fall River has 109,000 and 130 patrolmen; Newton, 38,806, with 65 patrolmen; Worcester, 147,000, 175 patrolmen; Springfield, 88,926, 108 patrolmen; Holyoke, 60,000, 60 patrolmen, and Cambridge 105,000, 116 patrolmen. Lynn, with a population of 89,336 persons, according to the national census of 1910, but at the present time having a population tabulated by the local board of health as 98,000 people, has a force of about 70 patrolmen.

## MOTOR VEHICLES

### New Combination Tried Out.

Jacksonville, Fla.—The triple combination auto fire truck for the local fire department has arrived and will soon be placed in service. The truck is a hose cart, a chemical wagon, and a pumping engine combined. It was on exhibition at the International Association of Fire Engineers' convention held recently in New Orleans.

### New Tractor Accepted.

Niagara Falls, N. Y.—The new \$4,000 front-drive tractor recently purchased by the city from the C. J. Cross Company has been attached to the 75-foot horse-driven aerial truck and given an official test by Mayor Laughlin, Commissioner Hackett, Fire Chief Utz and City Clerk Hogan. After being driven at 25 miles an hour, tried out on grades and found satisfactory, the machine was accepted.

### Celebrate New Combination.

Marblehead, Mass.—The town celebrated with a parade the arrival of the new combination auto fire truck. The new apparatus is a six-cylinder American-La France combination. It is somewhat larger than the truck now in use and is equipped with all the latest devices. It is capable of pumping 800 gallons of water per minute and will supply water for three lines of hose, the truck now in use being capable of only supplying two hose lines. It is equipped with powerful electric lamps and a large searchlight. The truck is equipped with a 50-gallon chemical tank and 250 feet of chemical hose and carries 1,200 feet of regular hose. It also carries an extension ladder. The new truck weighs 9,000 pounds and was purchased at a cost of \$9,000, which was appropriated by the town at the last annual town meeting. It can develop a speed of 50 miles per hour. The next step in the improvement of the fire protection service will be the purchase of a new auto hook and ladder truck, which will cost about \$5,700. The purchase of the hook and ladder auto would make the entire fire department horseless with the exception of the steamers, which would be very seldom used.

### At the New Orleans Convention.

New Orleans, La.—At the competitive test for pumping engines held during the convention of the International Association of Fire Engineers in this city the Robinson 900-gallon auto pumping engine completed the tests with a perfect score. The engine made the entire run without any adjustments. The machine is the regular Robinson machine—developing 110 h.p. from six cylinders. The pump is all bronze. The high pressure drive controls the gear, making the pump very flexible, even at 300 pounds pressure.



"ROBINSON" IN ACTION AT NEW ORLEANS TEST.

## GOVERNMENT AND FINANCE

### Commission Form in Kentucky.

Frankfort, Ky.—The voters of Frankfort rejected the proposition to adopt the commission form of government by a majority of 61 against it.

Owensboro, Ky.—The result of the election in Owensboro put an end to commission government. A combination of the party machines caused defeat by 290 votes.

Cynthiana, Ky.—The commission form of government carried here by a majority of 289 votes.

Hopkinsville, Ky.—The proposition to put Hopkinsville under a commission form of government on December 1, 1915, was carried after a hard fight in which the city administration lined up almost solidly against it.

Harrodsburg, Ky.—Commission form of government was victorious over the city council by a majority of 558. The form will be that for a fourth-class city.

Middlesboro, Ky.—Middlesboro adopted the commission form of government for a fourth-class city 302 for commission and 101 against.

### More Commission Defeats in New York.

Mt. Vernon, N. Y.—Mount Vernon voted down the proposition known as "Plan C" to adopt a commission form of government by 2,912 for and 3,049 against.

Cohoes, N. Y.—The proposition to give Cohoes a commission form of government with a city manager, the charter known as plan C, was defeated by a vote of 2,429 to 2,331, a majority of 98.

### New Charter for Toledo.

Toledo, O.—The voters secured the new city charter by a majority of about 5,000. It will become effective January 1. At the new election in November, 1915, the selection of mayor will be by non-partisan preferential process. The Toledo charter provides for election of 16 councilmen from wards at large. The only officers elected at large under the Toledo charter are the mayor and vice mayor. Directors of law and finance are to be appointed by the mayor. The charter gives the city the right to own the street car system and other public utilities.

### Dayton Bond Issues Defeated.

Dayton, O.—The first election, with several municipal issues at stake, since this form of government has come into power has been held. About a month ago the city commission put up to the people for ratification at the election two bond issues; one for \$250,000 to be used in buying several dumps and improving them for parks and playgrounds; the other for \$1,000,000 to be used in defraying the city's share (35%) of the cost of elevating the joint tracks through the heart of the city. At about the same time the Socialist Party, which has been against the new form of government from the first, petitioned the city commission to bring before the voters a bond issue for \$500,000 to construct and operate a municipal electric light plant. The city commission turned this proposition down, believing it would be financially inexpedient to engage in the electric light business in competition with a private corporation which has \$8,000,000 invested. The socialists took the proposition over the heads of the city commission by securing enough signatures to their petition to demand a referendum. At the same time the Greater Dayton Association began an active campaign for the passage of the bond issue for parks and playgrounds and grade crossing elimination and the defeat of the bond issue for the municipal light plant. The vote had the following results:

Parks and Playgrounds.....	for 9,784	against 16,931
Grade crossing Elimination.....	" 10,453	" 15,871
Municipal Light Plant.....	" 9,193	" 13,174

### Charter Not Re-Submitted.

Bay City, Mich.—Bay City's proposed commission form of charter, which was defeated at a special election held in September, was not re-submitted at the recent election. Circuit Judge Collins denied a motion for a mandamus to compel the city council to make provision for re-submission. Petitions signed by nearly 800 voters asking re-submission were filed but they were not verified as to signatures, and the council, after two weeks' delay, in which time the verifying affidavits were supplied, refused to grant the petitions, and by their delay gained so much time that it was impossible to give the proper notices of a re-submission prior to election day.

### Annexes 16 Square Miles.

Richmond, Va.—This city has annexed approximately sixteen square miles of new territory, more than doubling its present area, taking over taxable values amounting to \$11,720,750, and adding between 18,000 and 20,000 to its population. This ends a campaign for a larger Richmond begun more than two years ago. The police department extends its patrolling sphere, and the fire and health boards will cope with the situation as best they can, having no immediate funds with which they can begin the larger work prepared for them. Henrico County will lose nearly \$10,000,000 in taxable values. The towns which will become a part of Greater Richmond are: Ginter Park, Highland Park, North Richmond and Barton Heights, Swansboro and Woodland Heights are not incorporated. The burden of properly caring for the new territory began with annexation, and the finance committee has recommended for passage several emergency appropriations to care for the extension of the various city departments. The finance committee is also considering a \$534,000 issue of thirty-four year bonds, the proceeds from the sale of which are to be expended entirely upon the new territory for permanent improvements. If the bond issue is authorized the city will at once receive the benefit of taxes from the annexed real and personal values. Otherwise, the taxes received from the new area for the next five years must be spent within its bounds.

### \$1,000,000 Bonds Sold in Day.

Philadelphia, Pa.—To meet the demand of subscribers, city bonds to the amount of more than \$1,000,000, instead of the \$825,000 block which it was originally proposed to dispose of, were sold at the "over the counter" sale in the city treasurer's office in one day. Early in the morning the whole of the \$825,000 issue was exhausted, although a line of prospective customers was still waiting for an opportunity to purchase bonds. At a hastily called conference, Mayor Blankenburg, Treasurer McCoach and Controller Walton decided to increase the amount of bonds to be sold, and accommodate all who appeared at the office, as well as take care of mail orders. The bonds are for 35 years, were offered at par, and bear four per cent. interest. The city officials expressed their gratification at the manifestation of faith in the financial standing of the city, and declared that the sale had broken all records. The great majority of the five hundred subscribers took comparatively small blocks of the issue. Many sections of the country were represented in the sale. Orders from Denver, Charleston, Boston, New York, Worcester and other points were received. More than twenty-five Pennsylvania towns were represented for various amounts in the sale. The money derived from this sale will be used to pay for public improvements authorized by the \$7,000,000 loan, of which \$4,125,000 was negotiated some time ago.

### Somers System Successful.

Galveston, Tex.—Mayor Lewis Fisher, in answer to a question from Mayor A. P. Wooldridge, of Austin, Tex., as to the success of the Somers system of realty equalization said that this system was installed here Nov. 14, 1912, at a cost of \$5,750. It increased the assessed values for the year in which it was installed over the preceding year \$6,610,669. The assessed values of the great bulk of the taxpayers, and especially the small ones, were reduced. The majority of the people are well pleased with the results obtained by installing the system.

## RAPID TRANSIT

### Ten Years of the New York Subway.

New York, N. Y.—New York City's first subway has reached its tenth anniversary. The first section of it to be placed in operation was formally opened on October 27, 1904, when the then Mayor George B. McClellan opened the throttle on the first of three special trains carrying city and company officials and their guests. From the date of its opening to the close of the last fiscal year, June 30, 1914, the subway has carried 2,332,401,305 passengers, an average of more than 233,000,000 passengers per annum. The total operating revenue for the same period was \$120,084,198, and the operating expenses and taxes \$49,549,845. The rental paid to the city amounted to \$20,421,069.

### Design Scientific Seat for Subway Cars.

Brooklyn, N. Y.—The Brooklyn Rapid Transit Company has received from Dr. Henry King Taylor, professor of orthopedic surgery of the Post-Graduate Hospital, and secretary of the American Posture League, a letter expressing official approval for the seat designed for the new subway cars of the New York Municipal Railway Corporation through co-operation of the League's experts with the engineers of the railroad. The company is authorized to use the official label of approval of the League. It is the first time, within the knowledge of Dr. Taylor, that a railway company has considered the health and comfort of the public in designing a seat.

### City May Not Lay Rails.

Providence, R. I.—The city of Providence has no right to lay rails for a car line in its own streets, according to the ruling of City Solicitor Albert A. Baker, in an opinion sent to the board of aldermen. Mr. Baker's opinion states that there is no authority for such action in either the City Charter or the highway law and that such right is not inherent in a municipal corporation or included in any general powers. The opinion asserts that if the city desires tracks it must ask the general assembly for authority for the Rhode Island Company to lay such tracks.

### Six-Cent Fares in Massachusetts.

Boston, Mass.—Six-cent fares on every street railway line in the state will probably be the direct result of a very important decision just made by the public service commission, with reference to the Middlesex & Boston Railway Company, a line running from Waltham through Newton to a connection with the Boston & Worcester Street Railway in Natick. It is a connecting route south and west of Boston, joining with the Boston Elevated. The decision means that six-cent fares are allowed, but no extra charge for transfers; special trip tickets may be sold at the rate of nine for 50 cents; special trip tickets at the rate of 5 cents fare are discontinued; scholars' tickets must be furnished at the rate of three cents. The new schedule of fares on this road will become operative in 30 days. Attorney H. P. Trainor for the city of Waltham, the Waltham Board of Trade, the city of Newton, the towns of Wellesley, Needham, Watertown, Belmont, Natick, Bedford, Acton, Hopkinton, Ashland, all protested against the increase from the five-cent rate, but without avail. This is the order upon which will rest, as learned from the office of the public service commission, the decision in the case of every other street railway in the commonwealth, which would include the Bay State Street Railway Company on all its lines. It remains to be seen what the Legislature may do with it. The petitioning company asked for a uniform six-cent fare, with a one-cent charge for transfers. It admits that the charge for transfers is based mainly on its belief that it should have a larger revenue than the flat six-cent fare will give it. The commission has no difficulty in denying this transfer charge, because it states that it believes that all transfers should be free, and should be given at such points as may tend to produce equality in riding facilities, particularly within the limits of any city or town. This decision is of great interest because it is anticipated that all the other railways will follow with similar petitions.

## MISCELLANEOUS

### Municipal Dance Halls for Chicago.

Chicago, Ill.—Five municipal halls, operated under the direction of the city's department of public welfare, will be opened early next month, Mayor Harrison has announced. The City Council, at the Mayor's request, recently appropriated \$5,000 for the project. The first municipal dance will be given Dec. 2, and Mayor and Mrs. Carter H. Harrison have been invited to lead the grand march. All the modern dances will be permitted under restrictions imposed by Mrs. Leonora Z. Meder, head of the city's welfare department, and club women, who will act as chaperons. The inaugural dance will be followed by similar affairs four nights a week in various parts of the city during the winter months. Admission will be only 5 and 10 cents. The first dance at Dreamland will be supervised by Mrs. Gertrude Howe Britton of the Juvenile Protective Association and the investigators of the welfare department. Light refreshments and soft drinks at the dances, and the prices will be low, probably ranging from 3 to 5 cents.

### "Municipal Day" of University of Iowa.

Iowa City, Ia.—"City Waterworks" will be the general subject for the municipal day program to be given in this city on Nov. 20. Prof. George F. Kay, state geologist, will speak on "Underground Waters." R. L. Stevenson will have for his subject "Real Accounting Systems for Waterworks," and Prof. J. H. Dunlap will explain the waterworks data which he collected during his summer's investigation. "The Analysis of Water" is another subject which will be included in the program. This is the second annual municipal day to be scheduled by the University of Iowa extension division—the first being held last winter for the discussion of electric light problems.

### Planning Commission a City Department.

Binghamton, N. Y.—That the City Planning Commission is properly a department of the city government is the opinion of Corporation Counsel Marcy. The Commission thereupon adopted a resolution, asking the Board of Estimate and Apportionment to include in the forthcoming city budget an item of \$5,000 to be used by the Commission in equipping and supervising playgrounds, and in leasing or buying lands to be used for playground purposes. In order to establish definitely its relations with the other departments of the city government, the Commission adopted a resolution asking the corporation counsel to define the powers of the Commission. That the Commission has advisory powers is already established, and in exercising its rights in this way, a resolution was adopted asking the Common Council to establish 50 feet as a minimum width for new streets and to accept none of less width.

### Los Angeles to be a Flower City.

Los Angeles, Cal.—Three score municipalities, nearly one hundred civic organizations and 100,000 school children are banded together in Los Angeles city and county to make their section of the state a veritable floral paradise for 1915, when the San Francisco and San Diego great expositions will attract thousands of visitors to California. The task was begun nearly a year ago. The movement became so popular that the county supervisors appropriated more than half a million dollars to defray the cost of beautifying the public property, while private owners are spending many times that sum in floral displays. Two hundred miles of asphalt boulevards throughout the county are lined with rose trellises, the streets of Los Angeles are being decorated with stately palms and ferns, the parks will be gorgeous masses of colors, and playgrounds, vacant lots, home gardens and back yards will glow with native flowers. The decorative scheme is part of the plan of the 1915 general committee on entertainment and celebration of the Panama Canal. It is the stage setting for a series of elaborate open-air entertainments that will be ushered in with the Carnival of Roses at Pasadena, in the Sierra Nevada foothills near Los Angeles, on New Year's Day, in which forty cities will join.

## LEGAL NEWS

### A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

#### Sidewalks—Injuries to Pedestrians.

*Edred v. Kiernan et al.*—For a landowner to permit ice to form on the sidewalk in front of his premises, without effort to remove the accumulation, is not actionable wrongdoing, for which he is liable.—Supreme Court, Appellate Division, Second Department, 149 N. Y. S. 376.

#### Firemen's Salary—Deduction for Sickness.

*Walsh v. City of Bridgeport.*—Bridgeport City Ordinance March 15, 1909, section 134, provides that the board of fire commissioners may continue, in their discretion, the salary of any officer or member of the fire department who shall have received any injury while in the performance of his duty, incapacitating him from performing his usual duties in the department. Held, that such provision gives rise to a conclusive inference that firemen will not be entitled to salary during absence because of incapacity to perform their duties not received while in the performance of duty.—Supreme Court of Errors of Connecticut, 91 A. R. 969.

#### Ordinance—Validity.

*Ramsey v. City of Atlanta.*—A municipal ordinance declaring that it shall be unlawful for any person to carry intoxicating liquor or beer on his person for the purpose of unlawful sale, or to carry the same around the streets for the purpose of unlawful sale, and fixing a penalty for so doing, does not conflict with the state prohibition law, making it unlawful to "keep or furnish at any other public places, \* \* \* or keep on hand at their places of business, any alcoholic, spirituous, malt, or intoxicating liquors," etc. Acts 1907, pp. 81, 82 (Penal Code 1910, § 426). The municipal offense is separate and distinct from state crimes which may have been incidentally committed in connection with it. *Athens v. City of Atlanta*; 6 Ga. App. 244, 64 S. E. 711; *Allen v. Jennings*, 134 Ga. 338, 67 S. E. 883 (1).—Court of Appeals of Georgia, 83 S. E. R. 148.

#### Water Companies—Contract with Cities.

*Municipal Waterworks Co. v. City of Fort Smith.*—By ordinance defendant city granted a franchise to and entered into a contract with the predecessor of plaintiff water company. By the contract the city was given the right to purchase the plant of the company at stated periods, but by a subsequent agreement such right was postponed for 20 years from October 1, 1887, which was beyond the term of the franchise. By the original and subsequent contracts, water for certain purposes was to be furnished for the use of city free, and such agreement was to continue in force "during the existence of the franchise and contract." After the expiration of the term of the franchise, both the franchise and contract were treated by both parties as continuing in force; bills for hydrant rentals under the contract being presented and paid as before. On October 1, 1907, the city, having elected to purchase, brought suit to have the value of the plant determined in accordance with a provision of the contract. Shortly afterward plaintiff notified the city that it would thereafter charge for the water previously furnished under the contract free, but to this the city refused to assent. Held, that the contract period, during which the prices fixed therein were to continue in force, included the time necessary for the city to complete the purchase, and that plaintiff could not recover for water furnished the city during the pendency of the suit which, under the contract, was to be free. One of the purposes for which plaintiff contracted to furnish water free was the flushing of sewers. After its notice that it would charge for water so furnished, and counter notice by the city that it would not pay for the same, plaintiff continued to furnish it. Held, that if not furnished under the contract, plaintiff could not recover therefor on an implied assumpsit, since no promise to pay can be implied, contrary to the express declaration of the party sought to be charged.—District Court, W. D. of Kansas, Ft. Smith Division, 216 F. R. 431.

#### Opening Streets—Assessments—Establishing a Grade.

*Patterson et al. v. Mayor and City Council of Baltimore et al.*—Before property can be assessed for the opening of a street, its grade must be established. The award of damages for opening a street through one's land should include not only the market value of the land taken, but an allowance for any injury to the remainder of the tract.—Court of Appeals of Maryland, 91 A. R. 966.

#### Keeping Cattle—Licenses—Equality.

*Exparte Broussard.*—Beaumont City Ordinance, art. 991, provides that it shall be unlawful to establish or maintain any stock pens within 300 feet of any hotel or private residence in the city without a permit from the city council. Other provisions declare that the words "stock pen" shall include any lot wherein more than six head of cattle are kept. Held, that such ordinance was a proper exercise of the city's police power, and was not unconstitutional because the council might act arbitrarily, since it would be presumed that it would not do so, and, if it did, the person aggrieved would have an adequate remedy by mandamus.—Court of Criminal Appeals of Texas, 169 S. W. R. 660.

#### Removal of Officers—Sufficiency and Verification of Petition.

*State ex rel. Miller v. Berg, City Clerk.*—When a petition is filed for the removal of a councilman or commissioner, under section 5308, Rev. St. 1913, in a city where registration laws are in force, the city clerk, in determining whether or not the petition is signed by the requisite 30 per cent. of the qualified electors, is limited to the voters' register of such city.

Where such a petition is made up of a number of papers, and through oversight any of such papers have not been verified by the oath of one or more of the signers of the same, as required by section 5305, Rev. St. 1913, the city clerk should, on request, permit the attaching of such oath of verification, even after such petitions have been filed.—Supreme Court of Nebraska, 149 N. W. R. 61.

#### Judicial Notice—Inquiry to Employee—Liability.

*Mayor and Aldermen of City of Savannah v. Jordan.*—The duty of keeping the streets of a municipality free from matter which, if allowed to remain, would affect the health of the public is a governmental function, the exercise of which would exempt the municipality from liability to a suit for damages to an employee without fault, who is injured by reason of a defective cart in which he is hauling "the sweepings of the streets" of such municipality, and which has been furnished him for that purpose by the agents of the municipality.

(a) This court will take judicial cognizance that the "sweepings of the streets" of a municipality contain matter which, if allowed to remain in the streets, will injuriously affect the health of the citizens of such municipality.

(b) And this is so notwithstanding petition describes "the sweepings of the streets" as "dirt and trash."—Supreme Court of Georgia, 83 S. E. R. 109.

#### Contracts Creating Indebtedness—Validity.

*Boise Development Co., Limited, v. City of Boise.*—When a city enters in to a contract by the terms of which it becomes liable for a large expenditure of money, exceeding in that year the income and revenue provided for it for said year, without fully complying with all the provisions of section 3, art. 8, of the Constitution of Idaho relating to such expenditure, held, that said contract is void.

Where uncertain and contingent claims for alleged damages to the property of a corporation against a city are made a part of the consideration of a contract entered into between them, and said claims have never been liquidated, settled, or reduced to a definite fixed amount of indebtedness against said city before the date of the contract, by a judgment or decree of court, arbitration, compromise, nor in any manner whatever, if these sums are liquidated, settled, and fixed as a definite amount of indebtedness against the city for the first time by the contract itself, held, that this would constitute a new debt.—Supreme Court of Idaho, 143 P. R. 531.

## NEWS OF THE SOCIETIES

### Calendar of Meetings.

Nov. 17-21.

NATIONAL MUNICIPAL LEAGUE.—Annual Convention, Baltimore, Md. Secretary, Clinton Rogers Woodruff, North American Building, Philadelphia, Pa.

Nov. 18-20.

WASHINGTON STATE GOOD ROADS ASSOCIATION.—Spokane, Wash. Secretary, M. D. Lechey, Alaska Building, Seattle, Wash.

Nov. 23-28.

EXHIBITION OF STREET CLEANING APPLIANCES.—Department of Street Cleaning, City of New York. J. T. Fetherston, Commissioner of Street Cleaning.

Nov. 30-Dec. 8.

AMERICAN PUBLIC HEALTH ASSOCIATION.—Forty-second Annual Convention, Jacksonville, Fla. Dr. C. E. Terry, Chm., Executive Committee.

Dec. 1-4.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Municipal Day, Dec. 3, Report of Snow Removal Conference Committee—Annual Meeting, Engineering Societies Building, 29 West 39th street, New York. M. L. Cooke, Director Public Service, Philadelphia, Pa.

Dec. 2, 3, 4.

CITY MANAGERS' CONVENTION.—Springfield, Ohio. C. E. Ashburner, City Mgr., Springfield.

Dec. 14-18.

AMERICAN ROAD BUILDERS' ASSOCIATION.—11th Annual Convention; 5th Annual Good Roads Congress, and 6th Annual Exhibition of Machinery and Materials, International Amphitheatre, Chicago, Ill. Secretary, E. L. Powers, 150 Nassau st., New York, N. Y.

Feb. 10-17, 1915.

EIGHTH CHICAGO CEMENT SHOW.—Coliseum, Chicago, Ill. Cement Products Exhibition Co., J. P. Beck, General Manager, 208 S. La Salle Street, Chicago, Ill.

May 10-14, 1915.

AMERICAN WATERWORKS ASSOCIATION.—Annual Convention Cincinnati, O. Secretary, J. M. Diven, 47 State street, Troy, N. Y.

June 14-16, 1915.

SOUTHWESTERN WATERWORKS ASSOCIATION.—Annual Convention, Galveston, Tex. Secretary, F. L. Fulkerson, Waco, Tex.

Sept. 20-25, 1915.

INTERNATIONAL ENGINEERING CONGRESS.—Am. Soc. C. E., Am. Inst. Min. E., Am. Soc. Mech. E., Am. Inst. E. E. and Soc. N. A. & M. E., San Francisco, Cal. Secretary, W. A. Catell, Foxcroft Building, San Francisco, Cal.

### AMERICAN ROAD CONGRESS.

The fourth American Road Congress was held Nov. 9-13, at the Auditorium, Atlanta, Ga., about 3,000 delegates and visitors attending. The convention was called to order Monday morning by President Austin B. Fletcher. Governor Seaton delivered the welcoming address for the state of Georgia, in the course of which he told of the interest Georgia and the South are taking in good roads. He stated that several years ago convicts were put to work on the roads and that convict work had proved a cheap method of road construction. Mayor Woodard, in a brief address, welcomed the convention to the city. In his response to the addresses of welcome, President Fletcher told of the aims and objects of the congress and urged that the public road work be taken out of politics and be treated as a business undertaking.

He was followed by Logan Waller Page, director of the United States office of public roads, who praised the activity of the south in regards to good roads and reviewed the result of the road construction during the past year. He commented on convict labor as an

exceedingly important factor in solving road problems. Robert P. Hooper discussed the relation of automobiles to good roads. He was followed by Senator Hoke Smith, Leonard Tufts, chairman of the executive committee of the American Highway Association; George W. Cooley, state highway engineer of Minnesota, and Colonel Sidney Suggs of Oklahoma.

"Federal Legislation" was the main subject of the afternoon session, which was held under the auspices of the American Automobile Association. George C. Diehl told of the efforts of the association to obtain federal legislation for the construction of an efficient system of roads, which, he maintained, could not be obtained by building the roads piecemeal. He stated that one-half the states have only one-tenth of the taxing ability for road construction that New York and Massachusetts have.

President Fletcher, Tuesday morning, appointed on the resolutions committee, W. Tom Winn, county commissioner of Fielton County, chairman; William R. Roy, state highway commissioner of Washington; George C. Diehl, chairman of the good roads board of the American Automobile Association; Charles J. Bennett, state highway commissioner of Connecticut; H. J. Kuelling, county engineer of Milwaukee county, Wis.; W. D. Solner, chairman of the Massachusetts state highway commission; Henry W. Durham, chief engineer of highways of New York City; Frank F. Rogers, state highway commissioner of Michigan; C. R. Kenyon, Indianapolis; W. S. Gearhart, state highway engineer of Kansas; E. R. Morgan, state road engineer of Utah; James R. Marker, state highway commissioner of Ohio; Major Amos R. Fries, corps of engineers of the United States army; J. B. Hunter, deputy highway commissioner of Pennsylvania; Prof. D. J. McCaustland, Missouri.

Owing to the absence of several speakers, the Tuesday program was changed somewhat. Frederick W. Wadhams, of Albany, N. Y., who was scheduled to preside, was absent and President Fletcher took his place. P. T. Colgrove, chairman of a special committee from the American Bar Association and the American Highway Association, appointed to compile the road laws of the various states was absent, but his report was read by A. N. Johnson, of the Bureau of Municipal Research of New York. The report stated that the laws have been compiled and indexed and are now being digested and charted.

In the absence of Wm. G. Edens, J. P. Wilson presided on the subject of finance and economics. Reports from Fred W. Buck, deputy highway commissioner of New York, and E. A. Stevens, state highway commissioner of New Jersey, were read. Dr. Joseph

Hyde Pratt, state geologist of North Carolina, spoke on the educational field for the state highway department. The address of J. E. Pennypacker on road economics, which was scheduled for Tuesday afternoon, was given during the forenoon session. His address was summarized in the following ten propositions:

1. That all who share in the benefits of road improvements should share proportionately in the burdens.

2. That the degree of improvement should be proportionate to the traffic of the road improved.

3. That the rate of payment or the rate of accumulation of the sinking fund on any public debt contracted for road improvement should approximately equal the deterioration of the improvement.

4. That road building and maintenance comprise work requiring special qualifications on the part of those who direct it.

5. That responsibilities should be definite as to persons.

6. That continuous employment is more conducive to efficient service than intermittent and temporary employment.

7. That the specialists who direct road work should be appointed instead of elected, and that they should hold office during efficiency instead of for a fixed term.

8. That no road is wholly permanent and that it requires continuous upkeep, for which financial and supervisory provisions must be made.

9. That cash is a much more satisfactory form of tax than is labor.

10. That all agencies at the disposal of the state, capable of use in works of public improvement, should be used, rather than in such commercial production as would conflict with private enterprises.

A feature of the day was the woman's auxiliary to the good roads congress, held Tuesday from 10 until 2, in the Hotel Ansley.

The afternoon session convened at 2 o'clock. Richard Henry Dana, president of the National Civil Service Reform League, discussed the general subject of road building, with particular reference to the merit system. He told of some of the conditions in the New York Highway Department as revealed by the investigations of J. W. Osborne. Other addresses followed by Arthur M. Swanson, Civil Service Examiner of Philadelphia, by W. S. Keller, state highway commissioner of Kentucky on "Engineering Supervision of Road Construction" and by A. N. Johnson on "State Control of Road Work as a Policy."

At ten o'clock Wednesday morning the congress opened its session on "Construction and Maintenance." The following addresses were delivered: "Construction and Maintenance," chairman, Colonel Edward M. Bigelow, state highway commissioner of Pennsylvania and first vice-president of the congress. "Rights of Way," Austin B. Fletcher, state highway engineer of

California. Discussion opened by Mr. W. S. Gearhart, highway engineer of Kansas. "Drainage Structures," W. E. Atkinson, state highway engineer of Louisiana. Discussion opened by Mr. S. D. Foster, chief engineer state highway department of Pennsylvania. "Grades and Excavation," A. D. Williams, chief engineer state roads commission of West Virginia. Discussion opened by Mr. William R. Roy, state highway commissioner of Washington. "Light Traffic Roads," S. Percy Hooker, state superintendent of highways of New Hampshire. Discussion opened by Frank F. Rogers, highway commissioner of Michigan.

The addresses of the afternoon session at which J. H. MacDonald, former state highway commissioner of Connecticut presided: "Selecting the Roads to Be Improved," Fairfax Harrison, president Southern Railway Company, vice-president American Highways Association. "Heavy Traffic Roads," Henry G. Shirley, chief engineer state roads commission of Maryland. Discussion opened by W. A. Hansell, Jr., superintendent of public works, Fulton county, Georgia. "Maintenance of Earth Roads," George W. Cooley, state highway engineer of Minnesota. Discussion opened by H. R. Carter, state highway engineer of Arkansas. "Maintenance of Surfaced Roads," Colonel William S. Sohler, chairman Massachusetts highway commission.

Thursday morning's session of the congress consisted of four addresses, as follows:

Brigadier General William T. Russell, former chief of engineering corps, U. S. A., retired; C. J. Bennett, state highway commissioner of Connecticut, on "System in Road Management;" Henry W. Durham, chief engineer of highways, Manhattan, N. Y.; on "Street Construction and Maintenance;" Irving W. Patterson, chief road engineer of Rhode Island, on "Bituminous Macadam by the Cold Mixing Method."

Resolutions drawn by the resolutions committee, W. Tom Winn, of Atlanta, chairman, were presented to the congress Thursday morning and were unanimously adopted.

The resolutions adopted by the congress Thursday morning are as follows:

Resolved, That the American Road Congress emphatically indorse the principle of federal co-operation toward the construction of main highways and thus assist the several states to build the main market roads on the one-half of the country which is devoted to agriculture—and to build through main roads in the one-half of the country which is not predominantly agricultural but whose prosperity depends upon mining, the raising of live stock, and the presence of the health seeker and tourist.

Whereas, The American Road Congress believes and has long urged all states to enact uniform road legislation, and

Whereas, Experience has abundantly

demonstrated that efficiency and economy are not obtained in the construction and upkeep of main roads, except by the co-operation of the states through skilled departments, and

Whereas, Forty of the forty-eight states have enacted state and county legislation; Georgia, Indiana, North Carolina, South Carolina, Tennessee, Arkansas, Florida and Texas being the exceptions, and

Whereas, Federal aid and co-operation is near at hand and it is probable that states having no highway departments will be unable to participate in such aid, therefore be it

Resolved, That the American Road Congress in annual convention assembled in the city of Atlanta, embracing several thousand delegates representing every state, reaffirm its belief that state road departments and state aid are essential to secure efficiency and economy, and be it further

Resolved, That copies of these resolutions be sent to the governors of all states and to their various highway officials, and that they be urged to promptly commend such laws to the legislatures in their respective states.

Resolved, That the Lincoln Highway Association be commended for its successful voluntary effort in arranging with counties, cities and townships for a connected series of roads across the United States, thus providing a definite and continuous route to be used wholly or in part by those who wish to become acquainted with the agricultural, mining and scenic advantages of their own land.

Resolved, That the American Road Congress deplore the frequent accidents on the public highways and urge upon the various highway officials throughout the United States the enactment of the necessary rules and regulations to ensure the public safety.

Resolved, That the Federal government be urged to build highways across all Indian and forest reservations and all other federalized areas, where such connecting links are essential parts of established through routes of travel.

Resolved, That the sincere thanks of the American Road Congress be extended to the state of Georgia, the county of Fulton, the city of Atlanta and to the public press for their active co-operation, generous hospitality and assistance generally in making this the most successful road congress.

The congress closed Saturday morning with a business meeting at which reports from the secretary and treasurer were read, final resolutions presented, invitations for 1915 congress received and general questions briefly discussed.

Officers of the congress are not elected by the congress itself, but by the executive committee of the congress. The executive committee is elected by the officers of the American Highway Association acting jointly with the executive committee of the American Automobile Association. The executive committee of the congress

also chooses the next meeting place for the congress. It may be several months before the committee announces the new officers of the congress and the city where the next congress will be held.

At the auditorium in connection with the congress was a large exhibit of roads, road building machinery, road materials and allied articles, which filled the main hall of the auditorium, Gilmer street for a block and nearly all the space underneath the Washington street viaduct. The history of road-building as shown by the United States Government was most interesting as it included models of all varieties of roads from the Appian Way down to the modern roads. Demonstration roads built on the outskirts of Atlanta for the special benefit of the delegates attracted much attention. There were three of these, each of concrete, brick and sand-clay.

The concrete road is 6,000 feet long and 30 feet wide, 18 feet in the center being of concrete, with 6 feet of grouted rubble-stone gutters on either side. Two thousand feet of this road has been finished, and the remainder is under construction, so that those interested in concrete roads could see exactly how to build them. It is being built under specifications of the Association of American Portland Cement Manufacturers, with the association's engineer, Arthur S. Toner, in charge.

The cement for this pavement was furnished by the Dixie Portland Cement Co., Chattanooga, Tenn.; Standard Portland Cement Co., Birmingham, Ala.; Atlantic & Gulf Portland Cement Co., Birmingham, Ala., and Southern States Portland Cement Co., Rockmart, Ga. Five hundred linear feet of metal side forms were donated or sold at cost by the Trussed Concrete Steel Co., Youngstown, O.; expansion joint filler by the Philip Carey Manufacturing Co., Cincinnati; steel protected armor-plate joints by the Trussed Concrete Steel Co. and R. D. Baker & Co., Detroit, Mich., and reinforcing metal by American Steel & Wire Co., Chicago.

The brick road is 3,800 feet long, consisting of two stretches 11 feet in width on either side of a car track. The brick are laid on dirt, well rolled and covered with a sand cushion. The finished pavement is covered with cement filler. All the brick were furnished by the Southern Clay Manufacturing Co., Chattanooga, Tenn., who also supervised the construction work.

The sand-clay or top-soil road was built under direct supervision of Prof. C. M. Strahan of the University of Georgia, according to his specifications. This road is 40 feet wide, with 6-foot rubble-stone gutters on either side, and is 1½ miles long. This is the class of road being widely built throughout the South. All of these demonstrated roads were constructed by the use of convict labor.

The New York State Highway Department had an accurate reproduc-

tion in miniature of an improved highway across Storm King Mountain. This model, which was 20 feet long, 15 feet deep and 15 feet high and weighed about 4,000 pounds, showed the winding of the highway up the face of the cliff 400 feet above the Hudson River. The exhibits of the states of North Carolina, Massachusetts, Minnesota, Washington, Rhode Island, Virginia and Colorado were also very interesting and instructive.

Exhibits by individuals and firms included:

American Portland Cement Manufacturers' Association, Phila., Pa., cement products; concrete roadway.  
Ameis Road Co., Easton, Pa., road materials.  
Austin-Western Road Machinery Co., Chicago, Ill., road machinery.  
American Rolling Mill Co., Middletown, Ohio, metal culverts, etc.  
Atlas Portland Cement Co., New York, cement products.  
American Sheet and Tin Plate Co., Cincinnati, information and data on culverts.  
American Tar Products Co., Chicago, Ill., road binders.  
J. D. Adams & Co., Indianapolis, road grader.  
American Casting Co., Birmingham, Ala., road culverts.  
Allis-Chalmers Mfg. Co., Milwaukee, Wis., crushers, machinery.  
American Gas Machine Co., Albert Lea, Minn., machines.  
Acme Road Machine Co., Frankfort, N. Y., road machines.  
Buff & Buff, Boston, Mass., surveying and engineering instruments.  
C. L. Berger & Sons, Boston, Mass., engineering instruments.  
Blaw Steel Construction Co., Pittsburgh, Pa., steel products for road building.  
Barber Asphalt Paving Co., Phila., Pa., specimens of roads, pictures, pamphlets.  
Barret Mfg. Co., New York, transparencies, photographs.  
Bausch & Lomb Optical Co., New York, engineering instruments.  
Birmingham Slag Co., Birmingham, Ala., samples of slag, photographs.  
R. D. Baker Co., Detroit, armor plate for curbs.  
Corrugated Bar Co., Buffalo, N. Y., samples reinforcing material; hand books; printed matter.  
Carnegie Steel Co., Pittsburgh, road materials.  
Canton Culvert Co., Canton, O., culverts.  
Dixie Portland Cement Co., Chattanooga, Tenn., cement products.  
J. C. W. Denniston, Rochester, N. Y., paving blocks.  
Dunn Wire Cut Lug Brick Co., Conneaut, O., brick for road purposes.  
Eagle Wagon Works, Auburn, N. Y., wagons.  
Edison Portland Cement Co., cement products.  
Empire Rubber & Tire Co., Trenton, N. J., rubber tires.  
A. B. Farquhar & Co., Ltd., York, Pa., gasoline tractors, road and farm machinery, catalogues, photographs.  
Sam E. Finley, Atlanta, Ga., Finley method for bituminous surfacing.  
Sam E. Finley, Finley Method of bituminous surfacing.  
Gallion Iron Works, Gallion, O., culverts, models of machinery, moving pictures.  
W. & L. E. Gurley, Troy, N. Y., engineering instruments.  
Good Roads Machinery Co., Kennett Sq., Phila., road machinery of all kinds.  
Headley Good Roads Co., Philadelphia, road machinery, sample pavements.  
International Inst. Co., Cambridge, Mass., testing machines, etc.  
Inter-Ocean Oil Co., Philadelphia, oil products.  
Interstate Stone Mfg. Co., Piqua, O., stone for roads.  
Jones & Laughlin Steel Co., Pittsburgh, Pa., steel products.  
Koehring Machine Co., Milwaukee, paving mixer.  
Kelly-Springfield Motor Trucks Co., Springfield, O., road machinery, etc.  
Keuffel & Esser Co., Hoboken, N. J., engineering instruments.  
Kinney Mfg. Co., Boston, Mass., road oil sprinkler.  
Knickerbocker Portland Cement Co., Hudson, N. Y., cement products.  
Lehigh Portland Cement Co., Allentown, Pa., miniature village in concrete.  
Marion Machinery & Foundry Co., Marion, Ind., metal products.

Marion Steam Shovel Co., Marion O., steam shovels, photos.  
Mexican Petroleum Products Co., samples of asphalt.  
Novaculite Paving Co., St. Louis, Mo., paving materials.  
Ohio Tractor-Roller Sales Co., Columbus, O., kerosene or distillate-driven tractor-roller.  
Philadelphia Quartz Co., Philadelphia, rocmac solution, literature, photographs.  
National Paving Brick Manufacturers' Association, Cleveland, O., samples brick roads, photos, literature.  
Portsmouth Steel Co., Portsmouth, O., metal culverts.  
Robeson Process Co., 18 E. 41st St., New York, photos of glutrin treated roads, samples, glutrin.  
Rocmac, B. E. Miller, Philadelphia, photos, literature.  
Russell Grader Mfg. Co., Minneapolis, road machinery.  
Southern Clay Mfg. Co., Chattanooga, Tenn., specimens of brick and pavements, photos.  
T. L. Smith, Milwaukee, Wis., mixing paver, photos.  
Standard Oil Co., New York, asphalt samples, photos of roads.  
Southern Wood Preserving Co., Atlanta, Ga., section roadway, photos.  
Sewer Pipe & Fire Proof Co., Chattanooga, Tenn., drain pipe, road materials.  
Studebaker Corporation, South Bend, Ind., road machinery trucks, motors.  
Steel Protected Concrete Co., Philadelphia, Pa., curb bar.  
Standard Portland Cement Co., Birmingham, Ala., cement products.  
Standard Underground Cable Co., New York, N. Y., underground cable & conduits.  
Tarrant Mfg. Co., Saratoga Springs, N. Y., road building appliances.  
Troy Wagon Works Co., Troy, O., trucks, wagons.  
Thew Automatic Shovel Co., Lorain, O., steam shovels, photos.  
U. S. Asphalt Refining Co., New York City, Aztec oil products.  
Universal Portland Cement Co., Chicago, Ill., cement products, concrete road section.  
U. S. Tire Co., New York City, rubber products, tires.  
United Gas Imp. Co., Philadelphia, Pa., oil products, Ugite, road photos.  
Warren Bros. Co., Boston, Mass., sections of roads, literature, photos.  
Waring-Underwood Co., Philadelphia, Pa., expansion strips.  
The White Co., Cleveland, O., auto tractors, trucks.  
Waterloo Machinery Corporation, Waterloo, Ia., concrete mixer.  
Wheeling Mold & Foundry Co., Wheeling, W. Va., iron products.  
Warner-Quinlan Asphalt Co., New York City, asphalt.  
Western Wheeled Scraper Co., Aurora, Ill., road machinery.  
Yellow Pine Mfrs., Association, St. Louis, Mo., yellow pine paving blocks.

#### Lincoln Highway Association.

At the meeting at Philadelphia, Nov. 10, the Lincoln Highway Association elected the following officers: President, H. B. Joy, Detroit; vice-president, R. D. Chapin, Detroit; Carl G. Fisher, Indianapolis; A. R. Pardington, New York; W. F. Coan, Clinton; treasurer, Emory W. Clark, Detroit; engineer, Frank H. Trego, Springfield, Mass.; secretary, A. R. Pardington, New York.

#### AMERICAN ROAD BUILDERS' ASSOCIATION.

Acceptances have been received by Secretary E. L. Powers, of the American Road Builders' Association, from a number of well-known highway officials and engineers, announcing their willingness to prepare the leading papers on various subjects to be presented at the American Good Roads Congress to be held in Chicago, Dec. 14-18. The acceptances so far received and their subjects are as follows:

"Road Foundations: Concrete, Tel-

## PERSONALS

Emil Knichling, consulting expert of international reputation on water supply and sanitary engineering, died suddenly on November 9. Mr. Knichling was born in Kehl, Germany, in 1848, and came to Rochester, N. Y., a year later. His first position was with the city surveyor and after receiving his education at the University of Rochester and the Polytechnic School of Karlsruhe, Germany, and acting in various capacities on New York state canal work, he became assistant engineer to the Rochester water works, with which he was connected until 1900. Meanwhile he was consulting engineer to the Fredonia, N. Y., water works, which he designed, and sanitary engineer to the New York State Board of Health. In 1900 he established a practice as consulting engineer and he was connected with many important works. He was very active in many societies and author of numerous valuable contributions to the literature of his profession.

The following officials have been elected:

North Caldwell, N. J.—William Little, mayor; Thomas Pen, Lewis Fisher and John Hillman, councilmen.

West Caldwell, N. J.—Zenas G. Crane, mayor; George M. Canfield and J. M. Harrison, councilmen.

Montclair, N. J.—Edwin Mortimer Harrison, mayor.

Butler, N. J.—Jesse Ward, mayor; Geo. B. Williams, tax assessor; Joseph F. McLean and Frank Whipple, councilmen.

Bayonne, N. J.—Bert Daly, mayor; A. A. De Bonneville, recorder; Michael Donovan, Edward Nelson, Robert Gardner, Arthur Herrick and John L. Gotko, councilmen.

Egg Harbor City, N. J.—George Muller, mayor; Charles Kroekel, city treasurer.

Woodbury, N. J.—Samuel H. Ladd, mayor; John Holinger and William Atkinson, councilmen.

Hightstown, N. J.—Bert D. Thomas, mayor; J. I. Hutchinson and J. B. Schenck, councilmen.

Ventnor, N. J.—U. Dahlgren Albertson, mayor.

Roselle Park, N. J.—Harwood Fish, mayor (re-elected).

Westfield, N. J.—Harry W. Evans, mayor (re-elected); R. E. Perry, R. T. Hohenstein, W. R. Davis and R. L. De Camp, councilmen (re-elected).

Garwood, N. J.—Peter M. Erikson, mayor (re-elected).

Plainfield, N. J.—Leighton Calkins, mayor.

Springfield, N. J.—Charles Woodruff, surveyor of highways.

Highbridge, N. J.—William H. Black, mayor.

Stone Harbor, N. J.—Howard S. Risley, mayor.

Spotswood, N. J.—Phineas M. Bowne, mayor; N. E. Jolly, assessor; T. J. Brown, collector.

Perth Amboy, N. J.—Fred Garret-

(Continued on page 756.)

(Continued on page 756.)

## NEW APPLIANCES

### THE TURBINE SEWER MACHINE.

#### For Cleaning Difficult Sewer Stoppages.

The Turbine Sewer Cleaner is claimed by its manufacturers to be able to clean any stoppage in a sewer no matter how difficult for other methods. The device consists essentially of runners and cutters, adjusted to fit the sewer revolved by water pressure and pushed along with rods, or cables and windlass or jack. In operation a hose is attached and water delivered to the turbine at about 60 pounds pressure, giving 3 h.p. to the cutters which revolve at about the rate of an electric fan. The revolving cutters dislodge the material, cut the weeds, roots and other growths, grinding the other matter and carrying it away by the force of the water. At the same time the moving water scrubs the walls of the sewer. The runners and cutting knives can be adjusted so as to exactly fit the sewer. The special turbine windlass is simply constructed and easily set up and is used with cable for drawing the turbine through the sewer. Where windlass and cable cannot be used, as in completely stopped sewers, the forcing jack and sewer rods are used. Special non-buckling galvanized iron rods with special couplings to withstand the strain may be obtained. Wooden rods which float in 2½ inches of water are used in pulling cable or rope through the sewer.

The turbine device has been widely and successfully used in many cities. Henry J. Kruse, superintendent of sewers of Milwaukee, Wis., cleaned 319 feet of 12-inch sewer, choked with grease, in 16 hours with four men at a cost of \$16, or 5 cents a lineal foot, whereas laying new sewer at this time

would have cost \$3 or \$4 per foot. Kansas City, Mo., cleaned 7,801 feet of sewer in 14 days at a cost of 0.0315 cents per foot. The average cost of cleaning is put at about 3½ cents per foot with this device.

The illustrations show the turbine, windlass and forcing jack and a large pile of sand and gravel removed from a sewer at Wausau, Wis.

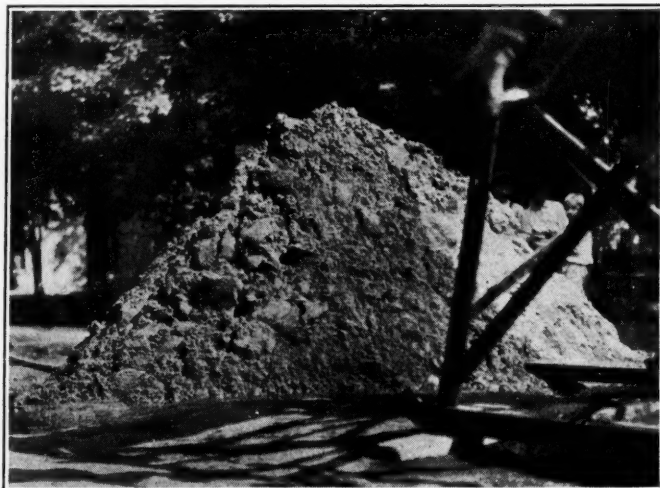
The turbine sewer machine, the windlass, jack and rods are made by the Turbine Sewer Machine Renovating Co., Inc., Milwaukee, Wis.

### "ATLAS" CONCRETE PIPE MACHINERY.

In the "Atlas" Concrete Pipe Machine for making bell and spigot pipe there are four rotating flexible steel tampers which strike powerful blows and produce uniform density from one end of the pipe to the other. By the Atlas process it is claimed to be possible to make pipes of extremely wet mixture so that the troweled interior is impermeable and smooth. In operation the tube above the mold is given a vertical reciprocating motion; at the same time the tube is caused to revolve around the wall of the pipe. The feed hopper delivers the mixed concrete into the funnel passing through the tube

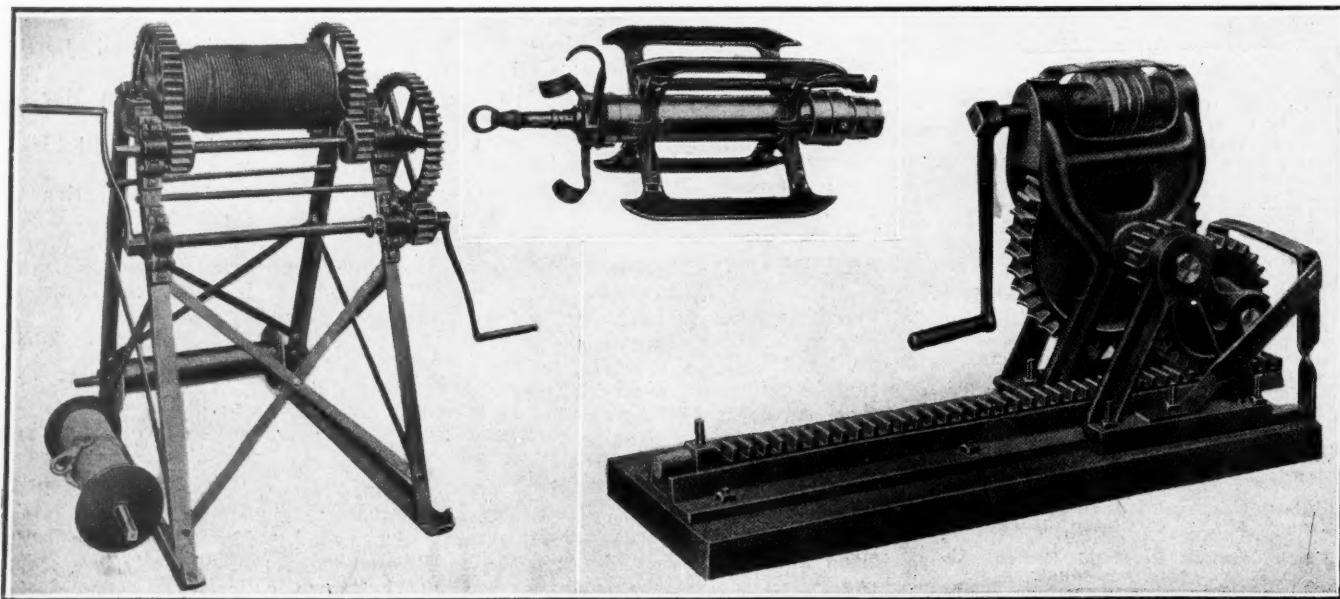
and spout of the lower end into the mold. The feed tube revolves with the tampers, the spout revolves with the tube, thus delivering a steady stream of concrete. Upon this material the tampers strike with heavy, rapid blows so that the entire space is covered by the four tampers as they travel around the forming pipe, two close to the core and two next to the jacket. By means of moving tables the pipe is taken off the machine and then taken away by means of special carts.

Some of the principal advantages claimed for this machine are that the core which does the troweling rotates independently of the other parts of the mechanism and can be operated indefinitely and instead of being drawn upward, tending to disturb the composi-



REMOVED FROM SEWER AT WAUSAU, WIS.

tion, the core is drawn downward. The machine is easily manipulated by four levers conveniently located. No



"TURBINE" WINDLASS.

"TURBINE" SEWER CLEANER.

"TURBINE" FORCING JACK.

iron pallets are used. By making the pipe bell down the bell is as dense as the cylinder part.

Atlas machinery is made by the Atlas Concrete Pipe Machinery Co., Salt Lake City, Utah. Concrete pipe made with this machine and process is being made by the Utah Concrete Pipe Co., Salt Lake City. The latter are making now sewer pipe for the local city for \$50,000 in sizes of 10 to 30 inches. In this contract 67 miles of sewer will be laid at a cost of over \$671,800 by Contractor Henry C. Ulen. The concrete pipe for this is required, by the city

crete pipe being laid near Salt Lake City.

#### CONCRETE MACHINERY For Making Sewer Pipe and Tile.

The McCracken sewer pipe machine is designed to make bell end sewer pipe from 4 to 24 inches in diameter and 24 and 30 inches long. The machine packs the material into the pipe very hard and dense and even more in the bell. The bell is of standard shape, length and thickness. The inner surface of pipe and bell is troweled so as to be absolutely waterproof.

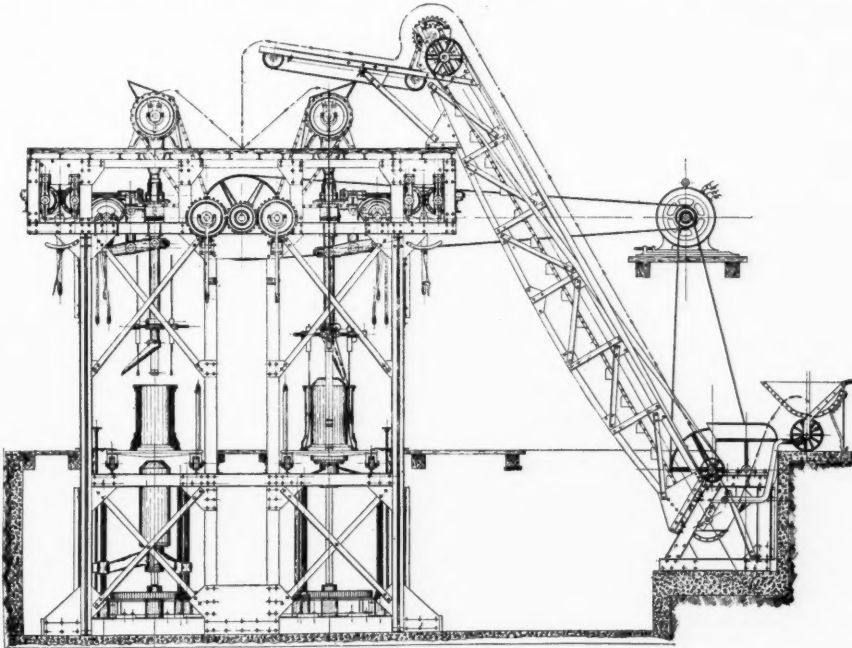


DIAGRAM OF "ATLAS" CONCRETE PIPE MACHINE.

specifications, to resist an internal pressure of 15 pounds without percolation and 50 pounds without fracture.

The illustrations show two views of the machine and also a picture of con-

The machine also makes chain tile 4 to 24 inches in diameter and 12, 18, 24 and 30 inches long.

The McCracken tile machine is made in two models. No. 1 is a strong ma-

chine with heavy steel frame, large shaftings and bearings and of simple construction—having no cams or unnecessary parts. It is noiseless and easily operated. It makes all sizes of tile from 3 to 18 inches in diameter and 12½ and 18 inches long. The material is packed so hard that the tiles can be carried away in the jackets without the use of pallets. This machine is 8 feet high and weighs 1,900 pounds. The McCracken No. 2 is similar, but smaller, making tile from 3 to 12 inches and 12¼ inches long.

The sewer pipe machine and the tile machine, model 1, are both shown on the next page. These machines are made by the Sioux City Engine & Machinery Co., 9th and Division streets, Sioux City, Iowa.

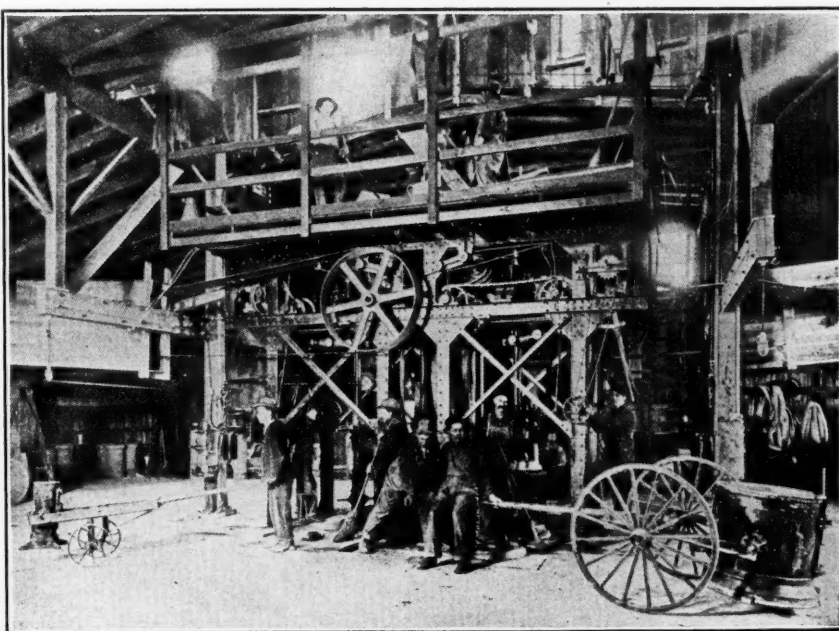
### INDUSTRIAL NEWS

**Cast Iron Pipe.**—Chicago—Award of 300 tons at Duluth, Minn., went to the National Cast Iron Pipe Co., of Alabama. Quotations: 4-inch, \$26; 6 to 12-inch, \$24; 16-inch and up, \$23.50. Birmingham—Quotations: 4-inch, \$20; 6-inch and up, \$18. New York—Wappinger's Falls, N. Y., has opened bids on 662 tons of 4, 6, 8 and 10-inch. Quotations: 6-inch, \$20 to \$20.50.

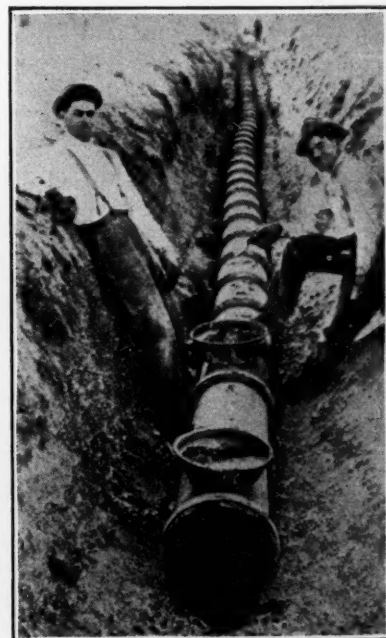
**Lead.**—Quotations: New York, \$3.50; St. Louis, \$3.40.

**The Alliance Clay Product Company,** Alliance, Ohio, is the latest addition to the family of licensees of the Dunn Wire-Cut-Lug Brick Co., of Conneaut, O. Others who have joined recently are Springfield Paving Brick Co., Springfield, Ill.; Terre Haute Vitrified Brick Co., Terre Haute, Ind.; Albion Vitrified Brick Co., Albion, Ill.

**The Brockway Motor Truck Co.,** Cortland, N. Y., has just delivered one of its model "U" combination chemical and hose wagons to Lewisburg, Pa., Fire Department.



"ATLAS" CONCRETE PIPE PROCESS.



CONCRETE PIPE NEAR SALT LAKE CITY.

## NEWS OF THE SOCIETIES

(Continued from page 753.)

ford, Gravel, etc."—L. A. Johnston, Division Engineer, Massachusetts Highway Commission.

"Organization of a State Highway Department."—John N. Carlisle, Commissioner of Highway of the State of New York.

"Traffic: Present Tendencies; Probable Development; Regulation."—A. W. Dean, Chief Engineer, Massachusetts Highway Commission.

"Machinery for Construction and Maintenance; State; Municipal; Contractors; Traction Haulage of Stone; Care of Machinery; Instructions to Engineer and Operator."—T. R. Agg, professor of Highway engineering, Iowa State College.

"Brick Roads and Streets."—John Laylin, Division Engineer, State Highway Department of Ohio.

"Surfaces or Floors for Bridges."—Clifford Older, Bridge Engineer, Illinois Highway Department.

"Bituminous Construction and Maintenance; Recent Practice."—William D. Uhler, Assistant Engineer, Bureau of Highways, Philadelphia, Pa.

"Concrete Roads."—H. J. Kuelling, County Highway Commissioner, Milwaukee County, Wisconsin.

"Street Paving in Small Cities."—Thomas H. MacDonald, State Highway Engineer of Iowa.

The above named subjects are among those selected by the program committee, and the acceptances are from those invited by the committee to prepare the leading papers on the subjects assigned. In each case the committee aimed to designate an active worker on the subject. Other acceptances will be duly announced, as will also those who will lead the discussions. Each of the persons named will prepare his paper, copies of which will be forwarded to those accepting designations to officially lead and participate in the respective discussions. These will prepare stated addresses, so as to bring out to the fullest extent all phases of the subject, using the paper as a text. After these are delivered the discussion is open to all. This method of procedure was first adopted by the American Road Builders' Association at its convention held at Rochester, N. Y., in 1911. Its efficiency in developing all the facts and views on any given subject has been highly commended by scientific men everywhere.

### Central Railway Electric Association.

The annual meeting of this association, in which all the electric railways in the middle west hold membership, will be held at Fort Wayne, Ind., Nov. 19 and 20. It is expected that a hundred delegates will attend the session which will be held in the assembly hall of the Anthony Hotel. A business meeting on Thursday morning will open the convention. R. N. Heming, of Anderson, the chairman of the standardization committee, will

present his report, and papers will be read by W. F. Goltra and E. S. Sawtelle. At 3 o'clock on Thursday afternoon there will be a meeting of the Central Electric Traffic Association. Thursday evening there will be a social session of the committee. Friday morning at 9 o'clock will come another business session of the association. The convention will close with the Friday morning meeting.

### League of California Municipalities.

At the seventeenth annual convention held at Monterey, Oakland was chosen as the next meeting place. A. E. Snow, Mayor of Fresno, was chosen president of the league for the ensuing term. Other officers elected were: Allen H. Wright, City Clerk of San Diego, first vice-president; Wallace Rutherford, City Attorney of Napa, second vice-president, and the incumbents, H. A. Mason and W. J. Locke of San Francisco, secretary and assistant secretary respectively.

## PERSONALS

(Continued from page 753.)

son, mayor (re-elected); H. E. Pickersgill, recorder (re-elected).

Stamford, Conn.—John M. Brown, mayor; E. O. Jansen, councilman-at-large; J. H. Provost, city clerk; W. N. Travis, treasurer; W. G. Smith auditor; H. Olfinger, city sheriff.

Chipley, Fla.—Tom J. Watts, Mayor; Mr. Martin, town marshal.

Baker, Oregon.—Charles L. Palmer, Mayor, re-elected.

Salem, Oregon.—Harley O. White, mayor; Charles F. Elgin, city recorder, re-elected; Frank Shedick, chief of

police, re-elected; John F. Davis, city treasurer.

Stockwell, Carl D., has been elected to succeed C. A. Niles as chief of the Bennington, Vt., Fire Department. Mr. Stockwell has been assistant chief for ten years and a member of this department for nineteen years. Grant Thomas was chosen assistant chief.

Weber, Peter J., has resigned as city chemist of Milwaukee, to accept the management of the American Metal Products Company of Milwaukee, manufacturers of bronze die castings.

Nesbitt, Hugh, formerly street cleaning commissioner of New York City, and for many years a republican leader has just died at the age of 78.

Benjamin F. Cleaves of Biddeford, William B. Skelton of Lewiston and Samuel W. Gould of Skowhegan have been nominated by Governor Hamis of Maine to constitute the board of public utility commission. The present terms are for 7, 5 and 3 years respectively. Mr. Cleaves was appointed chairman.

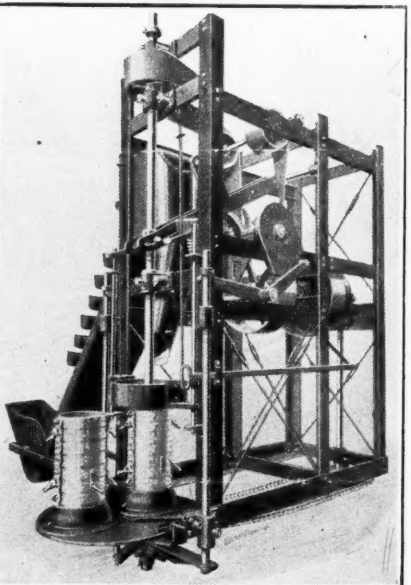
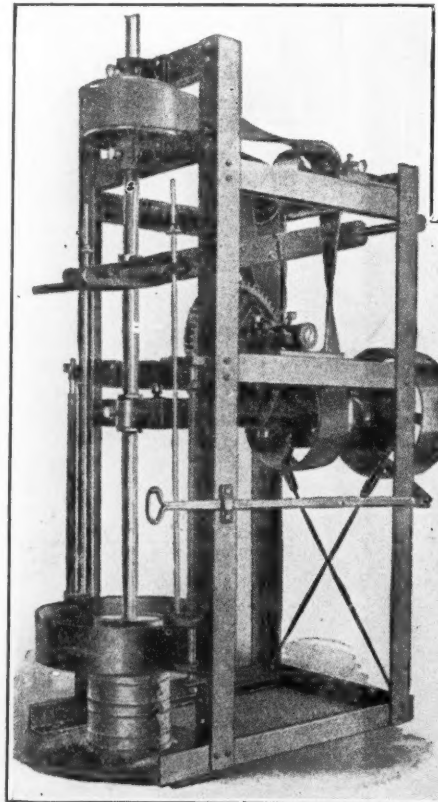
White, Henry M., was elected as superintendent of the Water Department at Oneida, N. Y., following his resignation as water commissioner.

Leonard, Alton W., for the last two years vice-president and general manager of the Puget Sound Traction, Light & Power Company, has been elected president of that company and member of the board of managers for the Stone & Webster interests. This is understood to carry with it the recognized headship of the electrical company interests in the Northwest that was held by the late Jacob Furth.

Meeks, Edward, mayor of Amherst, Va., has resigned his office. W. W. Gilbert has been elected in his place.

Lewis, George W., was elected highway superintendent of Broome County.

Jacobs, E. E., mayor of DuQuoin, Ill., has resigned his office to accept a civil position.



McCRACKEN CONCRETE MACHINERY.

Tile Machine.

Pipe Machine.

# ADVANCE CONTRACT NEWS

## ADVANCED INFORMATION BIDS ASKED FOR

## CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

### BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Ind., Richmond	11 a.m., Nov.	21..	Grading, draining and surfacing road.....	Comrs. Wayne Co.
Mont., Billings	11 a.m., Nov.	21..	2½ miles road grading.....	Yellow-Stone Co. Comms.
Ind., Ft. Wayne	4 p.m., Nov.	21..	Improvement of Anthony Boulevard.....	Board Park Comms.
Ind., Richmond	4 p.m., Nov.	21..	Street improvement, about \$20,000.....	County Comms.
Ind., Indianapolis	10 a.m., Nov.	23..	Curbing and paving, nine jobs.....	Board Public Works.
Ill., Joliet	Nov.	23..	Sidewalk construction.....	Arthur M. Barry, Clk.
O., New Concord	Noon, Nov.	23..	Grading and paving.....	W. C. Trace, City Clk.
la., Ottumwa	10 a.m., Nov.	23..	Brick and cement paving.....	J. T. Brady, City Engr.
N. J., Elizabeth	8 p.m., Nov.	23..	2,088 tons crushed stone, furnished and placed, 4,332 yds. excavation, and 5,370 sq. yds. of bituminous macadam roadway.....	Jacob L. Bauer, Twnp. Engr.
Va., Richmond	2 p.m., Nov.	23..	1.12 miles macadam and soil road.....	State Hwy. Comm.
Ind., Indianapolis	10 a.m., Nov.	23..	Gravel road construction.....	W. T. Patten, Aud.
Fla., Jacksonville	8 p.m., Nov.	23..	1,900 sq. yds. Dolorway pavement.....	Committee of Public Works.
Md., Baltimore	Noon, Nov.	24..	Four sections of state highway.....	State Roads Commission.
Pa., Harrisburg	10 a.m., Nov.	24..	Four Miles brick paving.....	State Highway Dept.
Pa., Butler	Nov.	24..	Road work.....	State Highway Dept.
Pa., Harrisburg	10 a.m., Nov.	24..	20,158 lin. ft. of brick road.....	State Highway Com.
Cal., Pasadena	Nov.	24..	35,900 sq. ft. 5-inch oil macadam pavement.....	City Clerk.
N. J., Elizabeth	8.30 p.m., Nov.	25..	2,600 lin. ft. flag sidewalk.....	W. H. Luster, Boro. Engr.
O., Cheviot	noon, Nov.	25..	Street improvement.....	A. J. Reusing, Clerk.
Ala., Centerville	Nov.	25..	Surfacing with chert, estimated cost \$10,500.....	Co. Comrs.
N. J., New Brunswick	8 p.m., Nov.	27..	Grading Fourth avenue.....	Geo. J. White, Mayor.
Ind., East Chicago	1.30 p.m., Nov.	27..	Cement sidewalks.....	Board Public Works.
Pa., Harrisburg	10 a.m., Nov.	28..	Reconstruction of 20,158 ft. brick block pavement.....	State Highway Dept.
Tex., Houston	10 a.m., Nov.	28..	Approaches to river bridge.....	H. L. Washburn, Co. Aud.
Va., Petersburg	noon, Nov.	30..	13,000 yds. creosoted wood block paving and 5,000 yds. granite block paving.....	City Engr.
O., Columbus	noon, Nov.	30..	Improving 3,400 ft. of road.....	John Scott, Clk. of Co. Comrs.
Mich., St. Joseph	Dec.	1..	Construction of 32 miles of road.....	Berrien Co. Comrs.
O., Cheviot	noon, Dec.	2..	Grading, curbing and macadamizing.....	A. J. Reusing, Clerk.
Ind., Evansville	10 a.m., Dec.	3..	Grading and macadamizing road.....	Bd. of Comrs., Vanderburg Co.
N. C., Asheville	Dec.	6..	Seven miles bituminous macadam road.....	C. H. Neal, Road Engr.
Ind., Brownstown	1.30 p.m., Dec.	7..	Grading and paving with gravel.....	Comrs. Jackson Co.
Ind., Hammond	10 a.m., Dec.	7..	Cement sidewalk.....	Board Public Works.
Ind., Salem	Dec.	7..	13,300 ft. road surfacing.....	Comrs. Washington Co.
Ind., Williamsport	9 a.m., Dec.	7..	Road construction.....	D. H. Moffit, Co. Aud.
Cal., Porterville	Dec.	7..	50,000 sq. yds. asphalt concrete.....	J. H. Althouse, City Engr.
Ind., Kokomo	10 a.m., Dec.	8..	Asphaltic concrete road No. 5527.....	E. B. Swift, Aud. Howard Co.
O., Lima	noon, Dec.	8..	22,000 sq. yds. concrete roadway.....	Board Co. Comms.
Miss., Aberdeen	Dec.	9..	Three miles of grading and surfacing.....	Gus. E. Hauser, Engr.
Miss., Amory	Dec.	9..	One mile street improvement.....	Gus. E. Hauser, Engr.
O., Upper Sandusky	Mar.	1..	Fifteen miles water bound macadam.....	J. Megurat, Aud., Wyandotte
SEWERAGE.				
Minn., St. Paul	10 a.m., Nov.	23..	Sewer on Portland Ave.....	Aug. Hohenstein, Pur. Agt.
Ill., Chicago	11 a.m., Nov.	23..	Sewer construction, two jobs.....	E. J. Blackin, Secy.
Wis., Oshkosh	2 p.m., Nov.	23..	Sewer.....	Board Public Works.
O., Fremont	Noon, Nov.	23..	Taking up and relaying tile drain.....	R. R. Williams, Clk.
N. Y., New York	3 p.m., Nov.	23..	Sewer construction at Public School No. 22.....	C. B. J. Snyder, Park Ave. & 59th St.
N. Y., New York	11 a.m., Nov.	25..	Sewer construction.....	President Boro. Brooklyn.
O., Salem	Noon, Nov.	23..	Sanitary sewer construction.....	I. N. Russell, Dir. P. S.
Va., Stuart	Nov.	30..	Sewerage system.....	J. N. Ambler, Winston-Salem.
Tenn., Chattanooga	10 a.m., Nov.	30..	Brick sewer.....	N. C. Public Road Comms.
O., Springfield	noon, Nov.	30..	Construction of sanitary sewer.....	Chas. Ashburner, City Mgr.
S. C., Lancaster	Dec.	1..	Sewage disposal plant.....	John Crawford, Clk.
Md., Baltimore	Dec.	2..	Interceptor trunk sewer, laterals and house connections and storm water drains.....	C. W. Hendrick, Ch. Eng. Sewerage Comm.
Ind., Waterloo	7 p.m., Dec.	3..	Sewage disposal plant and combined storm and sanitary sewer.....	Dr. W. R. Newcomer, Twm. Clk.
Minn., Brainerd	8 p.m., Dec.	7..	Lateral and district sewers.....	V. N. Roderick, City Clk.
N. J., Dunnellen	Dec.	7..	About 14 miles street sewer, vit. pipe with bituminous joints, 8 to 15-inch size, two pumping stations and 1,500 ft. 6-inch c.-i. force main.....	Geo. W. Fuller, Engr., 170 Broadway, N. Y.
N. J., Hackensack	Dec.	7..	Sanitary sewer system, disposal plant and pumping station.....	City Commission.
N. Y., New York	11 a.m., Dec.	9..	Storm water and sanitary sewers.....	President Boro. Brooklyn.
Mont., Roundup	Feb. 1, 1915	9..	Main sewer and disposal plant.....	City Engineer.
O., Upper Sandusky	Mar.	1..	Ten ditches 40,000 ft. long, 8 to 24-inch tile.....	J. Megurat, Aud. Wyandotte Co.
WATER SUPPLY.				
Ore., Oregon City	2 p.m., Nov.	21..	Water works construction, including dam and 25 miles of pipe line.....	William Anderson, South Fork Water Commission.
Fla., Tarpon Springs	7 p.m., Nov.	23..	Supplies for water department, including boiler, pump, pipe and fittings.....	A. P. Albough, Pres. Council.
Ill., Joliet	Nov.	23..	Water mains.....	Board Local Imp.

## BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Mass.	Fall River	Nov. 23	New pumping station	Jas. J. Kirby, Water Register.
N. J.	East Orange	8 p.m., Nov. 23	Pig lead and lead pipe	Board Water Comms.
N. Y.	Brooklyn	Nov. 24	Duplex feed pump	Navy Dept., Wash., D. C.
Ont.	Toronto	noon Nov. 24	72-inch steel conduit	Board of Control.
N. Y.	New York	Nov. 25	Furnishing and storing cast iron pipe and fittings	Wm. Williams, Comr.
Va.	Stuart	Nov. 30	Water works plant	J. N. Ambler, Winston-Salem, N. C.
La.	New Orleans	Noon, Dec.	1..150,000 lbs. of 5-ft. and 12-ft. riveted steel pipe	J. S. Shield, Secy.
Cal.	San Francisco	Dec.	1..Construction of 2,000,000 gallon reservoir	Water Comr.
N. C.	Gastonia	Dec.	1..One 2,000-gal. D. C. pump and one filter unit	H. Rutter, Supt. Pub. Wks.
N. Y.	Brooklyn	Dec.	1..Eight vertical Simplex feed pumps	Navy Dept., Wash., D. C.
Md.	Baltimore	Dec.	2..Reinforced concrete lining in tunnel	R. L. Clemmitt, Act. Water Engr.
Ill.	Chicago	Dec.	2..Water tunnel, including intake crib and shaft	Board Public Works.
O.	Cleveland	Dec.	2..Furnishing and placing filter equipment and operating machinery	Comr. of Pur. & Sup.
Ill.	Chicago	11 a.m., Dec.	2..Wilson Ave. water tunnel and crib	L. E. McGann, Comr. P. W.
Kan.	Fort Scott	Jan.	1..Water filtration system, 2,000,000 gallons capacity	J. Burton, Supt. Water Wks.
Greece	Athens	1915, Mar. 30	Water supply for Athens and additional cities, estimated cost, \$14,000,000	Bur. of Foreign & Domestic Commerce, Wash., D. C.

## LIGHTING AND POWER

Ind.	Huntingdon	Nov. 23	Piping in power plant	City Clerk.
N. J.	New Brunswick	2 p.m., Nov. 23	Electric wiring at Court House	Co. Building Committee.
D. C.	Washington	Nov. 23	Lamp standards, lanterns and lamp brackets	Supv. Architect.
N. Y.	New York	3 p.m., Nov. 23	Lighting and gas fixtures in hospital	Board of Trustees, Bellevue Hospital.
Mass.	Lynn	10.30 a.m., Nov. 24	Electric wiring and lighting system in school	Comms. Public Property.
N. J.	Jersey City	10.30 a.m., Nov. 25	300,000 round copper-coated carbons	Boulevard Comrs., Hudson Co.
D. C.	Washington	10.30 a.m., Nov. 27	Incandescent lamp for Panama Canal	Gen. Pur. Officer.
Ind.	Indianapolis	10 a.m., Nov. 27	Lighting parks	Park Commission.
O.	Sandusky	noon, Nov. 30	Furnishing and operating street lighting system	J. Moulter, Chr. Pub. Service.
Tex.	Barstow	10 a.m., Dec.	1..Construction of dams, reservoir, head gates and other improvements	Board of Directors.
Ill.	Pekin	10 a.m., Dec.	1..Machinery to convert steam-driven pumping station to electric	Harman Engrs. Co., 144 Fredonia Ave., Peoria, Ill.
Pa.	Pittsburgh	Noon, Dec.	2..Wicket irons, horses, and props for dam	F. R. Shunk, Lieut. Col. Engrs.
O.	Crestline	Noon, Dec.	8..Furnishing and operating street lighting system for ten years	Edward Libens, City Clk.
Ill.	West Hammond	8 p.m., Jan. 14	Overhead street lighting equipment	I. F. Mankowski, City Clk.

## FIRE EQUIPMENT

Ill.	Springfield	10 a.m., Nov. 25	Motor combination pumping engine and hose wagon	Elmer P. Hill, City Clk.
N. Y.	New York	10 a.m., Nov. 25	Repairs for police station	Arthur Woods, Police Comr.
N. J.	Highland Park	8 p.m., Nov. 27	600 ft. 2½-inch hose	Council of Bor. Highland Pk.
Pa.	Mt. Oliver	8 p.m., Dec.	7..500 ft. 2½-inch fire hose and two nozzles	Borough Council.

## BRIDGES

S. D.	Sioux Falls	Nov. 21	Bridges for 1915	County Comrs.
S. D.	Sioux Falls	Nov. 21	Approaches for bridges	Board Co. Comrs.
Kan.	Independence	Noon, Nov. 23	Repairs to McTaggart Bridge	G. A. Otwell, Co. Clk.
N. J.	New Brunswick	2.30 p.m., Nov. 23	Furnishing and placing 370 piles in the bridge over Raritan River	Board Chosen Freeholders.
Kan.	Coffeyville	Nov. 23	Repair of McTaggart bridge	G. A. Otwell, Co. Clk.
S. D.	Colome	2 p.m., Nov. 24	Bridges in Tripp County	F. E. Wells, Co. Aud.
La.	Crowley	Nov. 28	Two steel bridges and approach	Police Jury.
O.	Columbus	Noon, Nov. 30	Approaches to Hell-Branch bridge	Comrs. Franklin Co.
O.	Marietta	1 p.m., Dec.	1..Cow Run bridge	Comrs. Washington Co.
Mich.	Lansing	Noon, Dec.	1..130-foot riveted Pratt truss	F. F. Rogers, State Hwy. Com.
S. D.	Mitchell	Dec.	1..Bridges for 1915	County Commissioners.
O.	Marietta	1 p.m., Dec.	1..Chuffy bridge in Waterford Township	Board County Comrs.
S. D.	Redfield	Dec.	2..Bridge work for 1915	County Auditor.
Ore.	Portland	11 a.m., Dec.	7..Eight steel swing bridges	Maj. J. J. Morrow, U. S. Engr.
Ind.	Shelbyville	10 a.m., Dec.	8..Concrete culvert	F. W. Fagel, Aud. Shelby Co.
Kan.	Salina	Dec. 15	Cement bridge over Smoky River	A. Godfrey, Co. Clk.
S. D.	Elk Point	Dec. 24	Bridge construction for 1915	Edward Holden, Co. Aud.
S. D.	Howard	2 p.m., Jan. 5	Steel and concrete bridges for 1915	W. E. Leonard, Aud. Miner Co.
S. D.	Clear Lake	2 p.m., Jan. 6	Bridge construction for 1915	A. L. Larson, Aud., Duel Co.

## MISCELLANEOUS.

W. Va.	Charleston	noon, Nov. 21	Two-story building. 227 ft. long, for school of medicine	State Board of Control.
D. C.	Washington	2 p.m., Nov. 21	Rewiring patent office	B. Sweeney, Asst. Secy.
Ill.	Chicago	11 a.m., Nov. 21	Two jolt ramming machines	L. E. McGann, Comr. P. W.
Ida.	Boise	Nov. 22	Gate hoisting equipment	U. S. Reclamation Service.
N. J.	New Brunswick	2 p.m., Nov. 23	Electric wiring for Court House	County Bldg. Committee.
N. Y.	New York	2 p.m., Nov. 23	Interior decoration	Board of Trustees, Bellevue Hospital.
N. Y.	New York	11 a.m., Nov. 23	Furnishing automobile service	William Prendergast, Cont.
la.	Casey	2 p.m., Nov. 23	Construction of school house	C. E. Perry.
Okla.	El Reno	2 p.m., Nov. 24	Construction of Post Office	O. Wenderoth, Supt. Architect.
N. Y.	New York	2.30 p.m., Nov. 24	Furnishing and delivering coal	Department Public Charity.
R. I.	Providence	11 a.m., Nov. 24	Construction of quay wall	State Harbor Imp. Comm.
D. C.	Washington	Nov. 25	Extending and remodeling Post Office at Detroit, Mich.	Supervising Architect.
N. Y.	New York	Noon, Nov. 26	Extending pier No. 43	Comr. of Docks.
N. Y.	New York	10.30 a.m., Nov. 27	Erecting building for floating engine company	Robt. Adamson, Fire Comr.
N. Y.	New York	noon, Nov. 27	Construction of a dumping board	J. T. Fetherston, Commr. St. Cleaning.
Mass.	Boston	noon, Nov. 27	Three gasoline ambulances	F. H. Holt, Supt. Boston City Hospital.
Wis.	Sparta	3 p.m., Nov. 30	Construction of Post Office	O. Wenderoth, Sup. Architect.
Pa.	Philadelphia	Noon, Nov. 30	Gasoline cutter	Col. G. A. Zinn, 815 Witherspoon Bldg.
N. Y.	New York	12.15 p.m., Dec.	1..Reconstruction of portion of subway	Pub. Serv. Comm. First Dist.
Ind.	Indianapolis	10 a.m., Dec.	1..Repairs of metal ceilings	Comms. of Marion County.
Del.	Wilmington	11 a.m., Dec.	1..Interior fixtures for city and county building	Joint Commission.
Ill.	Robinson	2 p.m., Dec.	4..Construction of post office	Supervising Architect.
D. C.	Washington	Dec.	5..Post Office at Morristown, N. J.	Supervising Architect.
Mont.	Great Falls	Dec.	8..3,500 ft. canal construction	U. S. Reclamation Service.
N. Y.	New York	11 a.m., Dec.	9..Supplying letter heads for city	Supv. of City Record, Municipal Building.
Mont.	Great Falls	3 p.m., Dec. 15	38 miles of canal and laterals	A. P. Davis, Ch. Engr.
N. Y.	Glens Falls	3 p.m., Dec. 17	Construction of post office	Supervising Architect.

# STREETS AND ROADS

**Birmingham, Ala.**—Board of Commissioners has adopted improvement ordinance No. 854-C, providing for certain improvements on 14th Ave. from 24th to 26th Sts.

**Gadsden, Ala.**—Good roads bond issue has been endorsed by majority of 89 votes.

**Chico, Cal.**—Following discussion of location of proposed State Highway lateral from main road to Oroville, the Chico Business Men's Association has appointed J. T. Bevan to reopen subject with State Highway Commission in Sacramento. It was decided to endeavor to have location changed from point one mile south of Oroville to road which at present runs due west from Oroville and joins line of highway at Shippee Ranch.

**Marysville, Cal.**—Supervisors of Yuba County and City Council have decided to expend additional \$1,000 on grade they are jointly building from Sieber Winery Crossing to Simmerly Slough. Additional expense will be borne jointly by county and city.

**Red Bluff, Cal.**—Resolutions have been passed by County Supervisors ordering improvement of 95 miles of road in Tehama County which will cost in the neighborhood of \$12,000. The Red Bluff-Susanville road in District No. 3 is 50 miles long, and the Harrison Gulch road in Districts Nos. 1 and 4 is 45 miles in length. Latter road, which is in worst condition, will be improved from Matlock Grade to the Plumas County line. County Surveyor Luning has been ordered to prepare plans and specifications for improvement. Board will call for bids on November 17th.

**San Francisco, Cal.**—Finance Committee of Supervisors has recommended that Board of Works be authorized to receive bids for strip of asphalt pavement 30 ft. wide on whole length of Sloat boulevard. This will connect with pavement on Serra boulevard, 25 ft. wide, and with 40 ft. strip of paving that is to be laid on Portola drive, formerly known as Corbett Ave. Cost is estimated at \$71,000.

**San Francisco, Cal.**—The Supervisors' Committee on Streets has been notified that the United Railroads would pave with vitrified brick between and on sides of its tracks on Powell St., from Sutter to Bush. City is to pave other parts of this block with brick. The United Railroads will pave on Polk St., from Market to Hayes, and on Hayes, from Polk to Larkin, with asphalt. Committee has requested Board of Works to recommend at once the improvement of 19th Ave., as this work cannot be authorized until Board initiates proceedings. Committee has approved proposed widening of the sidewalk space on Geary St., between 44th and 48th Aves., fixing the width at 37½ ft. Appropriation of \$16,500 to pave the south half of Fulton St., from 38th Ave. to the Great Highway, has been recommended by committee.

**Boulder, Col.**—Four bids for construction of new road near Lyons have been opened by County Commissioners and contract will probably be awarded shortly. Four bids were as follows: Louis Solem, \$3,680; Thore Severson, \$6,475; Nels Jacobson, \$6,975; C. B. Hall, \$4,750. Road to be built is about 16,000 ft. long and extends from new bridge across the North St. Vrain to foot of Big Hill.

**Sarasota, Fla.**—City is advertising for bids on asphaltizing Main and cross streets, which comprise business district. Several miles of concrete sidewalks are being laid.

**St. Augustine, Fla.**—Petition has been received from property owners on Fort Marion circle asking for paving of that street with vitrified brick from St. George St. to bay. Petition was referred to Streets and Lanes Committee for investigation. Clerk was instructed to advertise for bids for paving Cincinnati Ave. with asphalt macadam.

**Tampa, Fla.**—Board of county commissioners has opened bids for second \$500,000 installment of bonds, of the \$1,000,000 good roads bond issue voted last year. First \$500,000 has been expended and roadwork for much of remaining \$500,000 contracted for. Highest bid was that of the Security Trust Co. of Spartanburg, S. C.—95 and accrued interest—and it is probable it will be accepted. All of this \$1,000,000 goes into brick-paved roads in country section. No other kind has been or will be built out of this issue of bonds.

**Alton, Ill.**—Last legal step required before State Highway Commission can call for bids for proposed state-aid road east of Alton has been taken. County

Board has passed resolution calling for drawing of anticipation warrant for sum of \$18,750 to be delivered over to county treasurer as Madison county's share of cost of state-aid road.

**Danville, Ill.**—Election has resulted in favor of issuing road bonds in sum of \$1,500,000. Thos. J. Dale is County Clerk.

**East St. Louis, Ill.**—The good roads proposition won by 7,211 majority.

**Fort Wayne, Ind.**—Board will ask engineer to prepare plans showing opening and widening of Sherman St. to meet the end of Herman St., near Van Buren St. bridge.

**Fort Wayne, Ind.**—Resolution for improving of Anthony Blvd., from Maumee River to State St., has been confirmed by Park Commissioners and bids will be received Nov. 21 for the work. Another resolution opening Rudisill Blvd., from Thomas to Anthony, will be prepared.

**Howard, Ind.**—Petition will be presented for construction of gravel road. E. B. Swift is Auditor.

**Indianapolis, Ind.**—A number of property owners interested in proposed improvement of Parkway Blvd. from 18th to 30th Sts., have asked Board of Public Works to receive bids for concrete or asphaltic concrete pavement in asking bids for other kinds of materials. Board was also asked to have contract let this year in order that advantage might be taken of any possible saving in labor or material. Board indicated that recommendations would be followed.

**Noblesville, Ind.**—James Gwinn and George Young, viewers on proposed boulevard on the Indianapolis Pike, have submitted their report to County Auditor Horton recommending that highway be improved. They suggest concrete roadway 16 ft. in width, material to be cement and washed gravel. Recommendations also include 26-ft. grade and 60-ft. right of way. County Surveyor Wann has estimated entire cost of 3 miles, according to the plans of viewers, at \$53,000.

**Shelbyville, Ind.**—Notice is given that sealed bids will be received at office of Treasurer of Shelby County, Shelbyville, Ind., up to 10 a. m., Nov. 20, 1914, for purchase of \$4,200, \$5,880, \$12,600 and \$12,400 improvement bonds of said county. W. A. McDonald is Treasurer.

**Dubuque, Ia.**—Resolution has been adopted for improvement of Putnam St.

**Grayson, Ky.**—Election has resulted in favor of issuing road bonds in sum of \$150,000.

**Annapolis, Md.**—State Roads Commission has consented to complete short strip of road connecting new state highway leading to Camp Parole with intersection of West St., where vitrified brick paving ends.

**Baltimore, Md.**—Election has resulted in favor of issuing street improvement bonds in sum of \$1,500,000.

**Boston, Mass.**—Change in plans of Metropolitan Park Commission for South Shore Blvd. have been announced after trip along route taken by members of commission and Mayor. Route will now follow Old Colony Ave., extending under bridge at Columbia road, and becoming part of new boulevard. This will do away with necessity of bridge and save \$50,000, which will be expended on improvements along boulevard.

**Boston, Mass.**—Work on \$50,000 boulevard and parkway in Wakefield will begin before next summer.

**North Adams, Mass.**—The Massachusetts Highway Commission has granted petition of Board of Selectmen to continue new state road this fall for additional distance in order to have good road through woods south of Walton bridge this year, and work of construction will be begun at once.

**Pittsfield, Mass.**—City has awarded issue of \$49,000 of 4½ per cent coupon street widening bonds, dated Nov. 1, 1914, and due \$7,000 1915 to 1921, inclusive, to Natick Five Cents Savings Bank.

**Williamstown, Mass.**—The Massachusetts Highway Commission has granted requests of Board of Selectmen to build additional road on Green river road to South Williamstown this fall in order to have good road through woods toward South Williamstown, worst section of road between south part of town and center. Work will be begun at once.

**Detroit, Mich.**—Ald. Dingeman has presented a petition asking for paving of Charlevoix St. from Joseph Campau Ave. to Montclair Ave., a distance of 3 miles.

**Downing, Mich.**—County Road Commissioners have recommended improvement of various roads next year.

**Grand Rapids, Mich.**—Monster petition will be presented to Governor Ferris asking for improvement of Michigan roads.

**Saginaw, Mich.**—Paving of Jefferson Ave. from Holland Ave. to Rust Ave. has been ordered.

**Duluth, Minn.**—Mayor Prince will introduce resolution before City Commission within next week authorizing a \$10,000 bond issue to carry on work at Point of Rocks.

**Townsend, Mont.**—Election has resulted in favor of issuing road bonds in sum of \$22,000.

**Fremont, Neb.**—Petition for road around Dorsey tract of land southwest of city has been granted by Board of Supervisors. New road will be 240 rods long, extending around three sides of tract. Road running south will be extension of M St. south from home of Supervisor A. W. Murphy.

**Asbury Park, N. J.**—Ordinance providing for repaving of Ocean Ave., Deal, has been passed on second reading by Deal commissioners. It will be adopted finally at next meeting of board.

**Atlantic City, N. J.**—Different routes for proposed Absecon-Atlantic City Blvd. are being considered by Board of Freeholders.

**Atlantic City, N. J.**—Plans and specifications for Somers Point-Longport Blvd. have been submitted for approval to State Road Commissioner Stevens. Should the plans receive his approval, Road Committee and County Engineer have been authorized to at once advertise for bids to be opened at meeting of Freeholders, which will take place in December. According to estimate of County Engineer Nelson following his preliminary survey of proposed road cost will be in neighborhood of \$271,000. Plans provide for completion of work by July 15, 1915.

**Camden, N. J.**—Ordinance has been passed making emergency appropriation of \$5,000 for repair and reconstruction of culverts necessitated by recent weakening and breaking of same.

**Camden, N. J.**—Ordinance has been passed directing paving of Division St. from Newton Ave. east to West Jersey and Seashore Railroad, and Sixth St. from Ferry Ave. to Viola St., with Belgian block on 4-in. concrete foundation.

**Collingswood, N. J.**—State Road Commissioner Stevens has notified Highway Committee of Collingswood Council that State would pay half cost of repaving Haddon Ave. entire length of borough, nearly two miles.

**East Orange, N. J.**—Ordinance has been passed for extension of Lloyd Brook pipe culvert.

**East Orange, N. J.**—Ordinance has been passed for improvement of various streets.

**Matawan, N. J.**—At meeting of Matawan Borough Council, ordinance to lay concrete sidewalks on Jackson St., from Middlesex St. to Washington St., and from Church to Little St., was introduced and passed on first reading.

**Millville, N. J.**—At meeting of the Cumberland County Board of Freeholders, a survey of road to Cape May south of Millville was ordered, and work will begin shortly.

**Plainfield, N. J.**—Ordinance has been adopted for laying out and opening of East 4th St.

**Plainfield, N. J.**—Councilman Blatz, chairman of street committee, has introduced in Council ordinance providing for widening of East Second St., between Watchung Ave. and Church St. Ordinance was passed on first and second reading and was ordered engrossed and advertised.

**Trenton, N. J.**—Members of Board of Freeholders will make up list of roads for contemplated improvement next year in accordance with letter of State Road Commissioner Stevens. Letter requests that schedule of roads be made in order that Road Commissioner may apportion moneys available for road improvement. River Road and Hightstown-Princeton Road are expected to be included in schedule.

**Brooklyn, N. Y.**—Ordinances have been approved for improvement of various streets.

**Canastota, N. Y.**—Board of Supervisors at Wampsville have made immediately available \$660 which is Madison county's share of additional appropriation needed to insure construction of short section of state road in Chittenango. Section extends from what is known as Gates Rd. at village line easterly to improved road in village.

**Cape Vincent, N. Y.**—New petition, asking trustees to call special election for purpose of voting on proposition to

bond village to build concrete road in Broadway, has been circulated and received required signatures. Election, it is thought, will be held some time this month.

**Huntington, L. I., N. Y.**—Budget calls for \$48,750 for improvement of highways.

**Little Falls, N. Y.**—Election has resulted in favor of issuing paving bonds in sum of \$50,000.

**Norwich, N. Y.**—At regular meeting of Common Council further steps were taken toward opening up proposed extension of Fair St. to Broad. City Engineer C. E. Harris presented maps of new street, which were approved by Council.

**Penn Yan, N. Y.**—Bids have been asked for construction of sidewalks about new Federal Building in this village. Proposals will be received by custodian of building until 3 p. m., Nov. 12.

**Riverhead, L. I., N. Y.**—Supervisors have adopted final resolutions for other roads, and contracts for these will probably be let so that work can be rushed in spring. One is Huntington-Amityville road, 4.69 miles long. This will cost \$65,800, according to estimate, of which State pays \$42,770 and county \$23,030. Other road is from Babylon road along Broad Hollow road to town line between Babylon and Huntington, 1.27 miles long. This will cost \$18,400, of which State pays \$11,960 and Suffolk County \$6,440. Supervisors also adopted a resolution calling attention of Commissioner Carlisle to fact that they have made the Quogue-Southampton road next in order of construction and asking him to have necessary surveys made as soon as possible. On motion of Supervisor Shiede a preliminary resolution was also adopted preparing for construction of road from Broad Hollow road and Farmingdale road to Nassau County line, a distance of 1.1 miles. In addition to fixing up all of these little ends here and there, connecting links as they are, supervisors are planning to map out further improvements in road matters.

**Sodus, N. Y.**—It is expected that contract will be let soon for continuation next year of state improved road eastward from Green's Corners through Sodus village, and Town Board of Sodus has made appropriation of \$3,500 to extend cement pavement to gutter through Main St., outside of state work in street. Estimated cost of pavement is \$1.70 per sq. yd., and so much of appropriation of \$3,500 will be used as is necessary for work.

**Syracuse, N. Y.**—The Syracuse City Planning Commission has come to an agreement on plans for new entrance and approach to State Fair Blvd. Commission is unanimous in view that best place for entrance to boulevard is just east of Harbor brook from West Genesee St.

**Syracuse, N. Y.**—All asphalt pavement on which maintenance guaranty has expired will be repaired next year by city without contract, according to opinion of Commissioner of Public Works Albert Van Wagner.

**Tottenville, S. I., N. Y.**—Borough President McCormack has advertised for bids, as follows: To regulate and grade the sidewalk space and to pave or repair sidewalks with concrete, wherever the same are not now paved or are out of repair, on Charles Ave. between Lafayette Ave. and Nicholas Ave., together with all work incidental thereto. For regulating and repaving with granite block pavement, on a concrete foundation, the roadway of Richmond turnpike from Cebra Ave. to Louis St., including intersections. For re-regulating and regrading Innis St. between Nicholas Ave. and John St.; to set bluestone curb, construct cement curb with steel nosing, reset old curbstone, lay cement sidewalk, relay sidewalk where the same is necessary, lay vitrified brick gutter 3 ft. wide on 6-in. concrete foundation, and to do all work necessary to the completion of the work described. For regulating and repaving with bituminous concrete pavement on a concrete foundation, the roadway of Innis St. from the west curb line of John St. to the east house line of Nicholas Ave., together with all work incidental thereto.

**Wappingers Falls, N. Y.**—See "Water Supply."

**Watertown, N. Y.**—Plans are being made for paving of public Square. From sentiment expressed by property owners about square it now seems certain that vitrified block pavement will be favored over wood block or any other paving material. Entire cost of paving square with brick will approximate \$45,000. Wood blocks would cost fully \$5,000

more. All told there is about 17,000 sq. yds. of pavement to be laid, but only north side of square will be given attention next summer.

**Asheville, N. C.**—County will issue road bonds in sum of \$75,000 during the next year.

**Bakersville, N. C.**—At meeting of Board of County Commissioners of Mitchell County order was made for election to be held in Bakersville Township to vote on \$25,000 bond issue for building of roads in this township. Election will be held on 12th day of December.

**Berlin, O.**—Election has resulted in favor of issuing road improvement bonds in sum of \$30,000. T. M. Elson is Township Clerk.

**Cincinnati, O.**—Council is considering widening of 12th St. and various other streets.

**Cincinnati, O.**—Ordinance has been adopted providing for issue of bonds in sum of \$8,000 for purpose of providing funds to pay city's portion of cost and expenses of improving Lindsay alley, Corbett Ave., Niles Ave., Dane Ave. and Stratford Ave. Fred Schneller is Clerk.

**Columbus, O.**—At meeting of the West Side Board of Trade resolution was adopted calling upon West Side Councilmen to urge paving of West Broad St. from Sandusky St. to Shady Lane, near state hospital.

**Columbus, O.**—Bids will be received at office of Board of County Commissioners of Franklin county, Columbus, O., until 12 o'clock, noon, on Friday, Dec. 11, for purchase of bonds of said county aggregating sum of \$48,000, for purpose of providing funds for improvement of certain roads in said county. John Scott is Clerk of Board.

**Dayton, O.**—It is probable that City Manager Waite will advise City Commission to enact necessary legislation for paving of Main St., from 5th to Monument, some time next year. Paving of 3d St. will be delayed until after sewer system now in progress shall have been completed.

**Marion, O.**—A petition to pave Marion Ave., from Windsor St. to Prospect St., has been referred to street and alley committee. Petition to pave Girard Ave. from Duluth Ave. to Marion Ave., has also been referred.

**Springfield, O.**—Bids have been received for paving of Belmont Ave. as follows: James J. McHugh, Trinidad Lake asphalt with stone base, \$1.87 per yd.; gravel base, \$1.86, and \$2.80 for brick paving between the car tracks. W. F. Payne, \$1.70 per yd. for Trinidad Lake asphalt and \$2.80 on Hocking block paving between tracks. Krumholtz & Huonker, \$1.68 on Trinidad Lake asphalt with gravel base and \$2.63 on track paving. Estimated cost of work is \$3,881, city's share being \$1,430.93; property owners \$1,345.01, and the street car company's share, \$1,115. Bids have been referred to Chief Engineer Bahin for tabulation.

**Chester, Pa.**—Ordinance has been passed at meeting of City Council providing for paving and resetting of curbs on 24th St., between Edgmont Ave. and Crosby St. and on 19th St., between Hyatt St. and Washington Boulevard.

**Chester, Pa.**—Sum of \$45,900 has been appropriated to Department of Streets for paving and repaving of old streets.

**Miners Mills, Pa.**—Election has resulted in favor of issuing street improvement bonds in sum of \$40,000.

**Wilkes-Barre, Pa.**—Ordinance has been introduced providing for grading, curbing and paving following streets: Blackman St., South Main and the city line; South St., between Lincoln and Sheridan Sts.; South Welles St., between South and Hill Sts.; Walnut St., between Carey Ave. and South River St.; O'Neill Ave., between North Main and North River Sts. Ordinances were all referred to committee of whole and ordered printed.

**Williamsport, Pa.**—Bill has passed third reading providing for paving of Water St. from south side of West 4th St. to north side of alley south of West 4th St.

**East Providence, R. I.**—It has been voted to appropriate \$32,000 for permanent improvement of Taunton Ave., between Six Corners and Watchemoket Sq., and to ask State Legislature for permission to issue 20-year bonds for highway loan of that amount.

**Woonsocket, R. I.**—City is contemplating widening of Hamlet Ave. at Blackston river.

**Woonsocket, R. I.**—City is contemplating paving of South Main St. from Market Sq. to Providence St. with granite blocks; in South Main St. from Providence St. to City line with asphalt macadam; in Providence St. from South Main St. to Ave. C with asphalt macadam.

**Woonsocket, R. I.**—Resolution appropriating \$6,000 for working grade on Fairmont St. from 4th St. to 10th Ave., has been referred to finance committee.

**Sioux Falls, S. D.**—Motion has been made and seconded that City Auditor be instructed to advertise for bids for grading of following streets, bids to be received up to Nov. 16, 1914, which motion prevailed: 2d St., from Dakato Ave. to Grange Ave.; Norton Ave., from 26th St. to 29th St.; Menlo Ave., from 15th St. to 22d St.; Weber Ave., from 3d St. to Bailey St.

**Austin, Tex.**—An effort is being made by Chamber of Commerce to get people of Austin behind movement to improve Dam Blvd. and make a well graded and scientifically built highway from city proper to Lake Austin. It has been estimated that cost of making road will not exceed \$2,500 per mile. Committee in charge of matter will meet this week to discuss plans.

**Bonham, Tex.**—J. C. Wonder, Government good roads expert, is in Bonham, working with good roads commissioners of this precinct in preliminary work of preparing for construction of highways authorized by \$250,000 bond issue voted for that purpose several months ago. Bonds have been sold, and when proper material is located work will begin on roads.

**Texas City, Tex.**—City will vote Dec. 2 on question of issuing street improvement bonds in sum of \$65,000.

**Lynchburg, Va.**—Resolution has been adopted for paving of Main St.

**Norfolk, Va.**—Bids for paving and curbing in Salter St. will be asked shortly.

**Warwood, W. Va.**—Work will be started in near future on improving of 3d St., between Warmwood and Ohio Aves. Work will be done by Street Commissioner Edward Brooks and his force of men. Cinders will be used in filling holes in streets.

**Seattle, Wash.**—Resolutions have been adopted for improvement of various streets.

**Vancouver, Wash.**—Clarke County may aid in resurfacing of 5th St.

**Superior, Wis.**—Members of road committee will recommend at meeting, Nov. 19, the building of dirt roads in Douglas County with mixture of sand and clay. A levy of \$100,000 for road work during next year will probably be recommended to board by roads and bridges committee.

#### BIDS RECEIVED.

**Pottsville, Pa.**—City Engineer W. S. Pugh has submitted to City Council following estimate of work done by contractor, M. A. Mangan, on account of contract with city of Pottsville for regrading, paving and improving of Market St., from 4th to 12th St., 8 squares, and Logan St., from East Norwegian to Arch St., 2 squares, up to date of Nov. 1, 1914: 3,013 cu. yds. of digging or excavating at 65c., \$1,958.45; 8,720 sq. yds. grooved wood block paving, at \$2.90, \$25,288; 4,844.41 lin. ft. steel-bound granolithic straight curb at 85c., \$41,171.76; 507.05 lin. ft. of same, s. b. g. but curved curb, at \$1, \$507.05; 12,078.4 sq. ft. flagstone sidewalk reset, at 10c., \$1,207.84; 12,431.2 sq. ft. brick sidewalk, reset, at 5c., \$621.56; 425 lin. ft. 8-in. curbing constructed around the monument park, at 85c., \$361.25; 90 lin. ft. concrete retaining walls constructed around the base of the Soldiers' Monument, at \$2, \$180; 52 cu. yds. concrete reinforced with expanded metal constructed over the city sewer on Market St., between 4th and 6th Sts., at \$6, \$312. Total, \$34,553.90.

#### CONTRACTS AWARDED.

**Camden, Ala.**—To D. R. Cook & Co., Selma, Ala., for grading, draining and surfacing with clay-gravel approximately 4½ miles of state aid road for \$1,867.

**Sacramento, Cal.**—Contract for \$20,000 worth of street and sidewalk work has been let by North Sacramento Land Co. to T. P. Costello, the work to be done in Subdivision 9. Contract will mean the construction of four miles of oiled macadam road.

**Santa Ana, Cal.**—To Max L. Huberman, of this city, for paving of Bradford Ave. at Placentia, at \$5,533.

**Sterling, Conn.**—To Amos D. Bridges, Hazardville, Conn., for construction of 5,480 ft. of native stone, macadam or gravel road by State Highway Commission.

**St. Augustine, Fla.**—C. S. Young Construction Co.'s bid for paving extra 4 ft. on Central Ave. at \$1.81 per sq. yd. has been received and contract awarded to them.

**Lewiston, Ida.**—For paving 7 miles Lewiston-Orchards Highway to Warren Construction Co. at \$92,000.

**Moscow, Ida.**—To Geo. W. Wycoff, Spokane, for paving streets in university section on basis of \$1.42. Pavement will be Dolarway pavement with 6-in. concrete base and 1/2-in. wearing surface. Contract price is \$11,132.66, which includes curbs, sewer and gutter.

**Cairo, Ill.**—By Board Local Improvements for paving and sewer work in Paving Dist. No. 1 as follows: Paving and sewerage of 6 streets to Prosser & Halliday, Cairo, at \$39,033; paving of 3 streets to Fitzgerald & Bland, Cairo, at \$9,837.

**Canton, Ill.**—Contract for building of extensions to West Maple, West Locust and North Main St. hard roads has been let to Carpenter Construction Co., Coverland, Ind. Contract price for three extensions is \$33,443.

**Chicago, Ill.**—By Board of Local Improvements for 6-ft. cement sidewalks in various streets to G. Kehl & Son Co. and Robert R. Anderson.

**Lafayette, Ind.**—Contract for stoning of Huntington Rd. in Lafayette township has been let by County Commissioners to Harley Sommers on his bid of \$22,444. Estimate was \$25,327.20. Road will be stoned for a distance of 31,120 ft., but only part of work will be done this year.

**Shelbyville, Ind.**—Four contracts for road improvements, totaling \$32,675, have been awarded by County Commissioners. The contracts were awarded as follows: Shadley Rd., Sugar Creek Twp., William H. Ogden, \$11,768. There were eight other bidders. Clarence Sandefur, superintendent of construction. Howe Rd., Washington Twp., William H. Ogden, \$5,364. Ten other bidders. James Howe, superintendent. Fox Rd., Brandywine Twp., William H. Ogden, \$3,723. Six other bidders. Richard Huber, superintendent. Green Rd., on line between Shelby and Washington Twps., Kernodle, Dale & Fulwider, \$11,820. Eight other bidders. Louis Weinantz, superintendent.

**Clinton, Ia.**—A. R. Coffey of Decorah has been awarded contract for constructing paving on South 4th St., from alley south of 7th to 10th Ave. Following bids were presented: J. F. Bredow, Davenport, \$6,414; J. J. McGuigan, Albany, N. Y., \$5,504.40; D. E. Keeler, Davenport, \$6,166.90; A. R. Coffey, Decorah, \$5,168; Dearborn Co., Waterloo, \$6,535; Carey & Sons, Clinton, \$5,465.

**Council Bluffs, Ia.**—E. A. Wickham was successful bidder for new paving on Broadway, west side of Indian creek, between Oak and Hunter Sts., when bids for this work were opened. There were but two bids for this paving, which is to be of concrete. J. J. Sloan of Sioux Falls bid to do work for \$1.59 per sq. yd. Mr. Wickham's bid was \$1.45 per sq. yd. Paving will not be begun this year.

**Baltimore, Md.**—The Consolidated Engineering Co. has been awarded two contracts for paving by Board of Awards on its bids of \$45,309.75 on contract No. 99 and \$39,584.50 on contract No. 100. Contracts provide for removal of cobble stones and laying of redressed granite blocks on following streets: Caroline St., from Thames to Pratt; Exeter St., from Low to Gay; Fell St., from Ann St. to water front; Wolfe St., from Fell to Aliceanna, and Thames St., from Philpot St. to Broadway.

**BillERICA, Mass.**—Contract for New Concord Rd. has been awarded to M. W. Tarbell of Lowell at \$4,100. Road will be of best macadam.

**Boston, Mass.**—By Massachusetts Highway Commission, as follows: Williamsburg—To Columbus Construction Co., Boston, as follows: 4,000 cu. yds. excav., 50c.; 5,700 tons broken stone, \$1.45; 9,400 gals. bituminous material, 4c.; 4,000 cu. yds. stone fill, 75c.; total, \$13,641. Next 3 lowest bids: R. F. Hudson, Melrose, \$15,514; Horne-Lowe Construction Co., Milbury, \$15,686; Fred E. Ellis, Melrose, \$16,096. Montague—To Lane Construction Co., Meriden, Conn., as follows: 100 cu. yds. excav., 40c.; 100 cu. yds. borrow sand, \$1; 2,300 tons

broken stone, \$1.95; 5,000 gals. bituminous material, 4c.; total, \$4,825.

**Grand Rapids, Mich.**—O. r. Carpenter has been awarded contract for Lynch St. improvement at \$1,000.09; Fred Jansma contract for building concrete steps at Franklin St. for \$412.17.

**St. Paul, Minn.**—Bids have been opened for several public improvement contracts. Low bidders are: Christ Johnson, \$1,543, for grading Montreal St. from West 7th St. to Elway. Christ Johnson, \$1,452 for the grading of Hythe St. from Doswell to Hampden Ave. Peter Dickson, \$1,000, grading Hudson Ave. from Hester to Earl St. Christ Johnson, \$1,109, grading Lake Como and Phalen Ave. from Edgerton St. to Payne Ave. St. Paul Tile Co., \$1,064, for curbing Taylor Ave. from Aldine to Cushing.

**St. Peter, Minn.**—To Joe Sampson, Canby, Minn., for construction of state rural highway No. 54, including grading, graveling, culverts and bridges, for \$42,418.

**Duncan, Miss.**—To William Leftwich Co., Decatur, Ala., for street paving, to cost several thousand dollars.

**Vicksburg, Miss.**—To Owens Construction Co., Warren County Supervisors for additional 8.12 miles of road for state highway, for \$37,112.

**Great Falls, Mont.**—For paving 76,725 sq. yds. in Dist. 157, bitulithic paving, to S. Birch & Sons Const. Co. at \$1.81 per sq. yd., and 29,342 sq. yds. in Dist. 158 at \$1.81 per sq. yd., and 7,919 sq. yds. creosote wood block in Dist. 208 at \$2.84 per sq. yd. Contract for 142,650 lin. ft. concrete curbing was awarded to the Miracle Concrete Corp. at 40 cts. straight curb and 45 cts. curved curb. Total, \$64,191.43. Contract for 551,205 sq. ft. concrete sidewalks to the Miracle Concrete Corp. at 13.4 cts. per sq. ft. residence walks, and 13.75 cts. business walks. Total, \$94,265.44. M. L. Morris is City Engineer.

**Canden, N. J.**—Bids have been opened for \$150,000 worth of road improvements. Roads to be improved are: Main St., Haddonfield; King's Highway, from the borough limits of Haddonfield to the Burlington County line; Kresson road from the bridge at Batesville to Hillman's Corner, and Sharp's Corner road, from Clementon to Blackwood. Successful bidders were: Main St., Kelley-McFeeley Construction Co., \$45,833.49; King's Highway, E. C. Humphreys, \$67,689.23; Sharp's Corner road, Gibbs & Co., \$13,930.86; Kresson road, James McGowan, \$15,911.23.

**Millburn, N. J.**—For concrete road on Springfield Ave. to Franklin Contr. Co., Hudson St., New York, at \$1.60 per sq. yd.

**Asheville, N. C.**—Acting on advice of advisory committee, recently appointed, Board of County Commissioners have awarded contract for rebuilding of Asheville-Weaver Highway to Crinkley Co., of Harriman, Tenn., and voted a \$75,000 bond issue with which to build road. In awarding contract to Crinkley Co., their bid of 61c. per sq. yd. for penetration method and 72c. for mixing method, each to be one-half, was accepted.

**Canton, O.**—By Board of Control, for paving as follows: Improvement of Harrison Ave., N. W., to Wise Bros., at \$9,338; paving of 7th St., N. E., and Ryan Court, to Hahn Bros., \$32,045, and improvement of 4th St., N. W., to Glen Hadley, at \$14,934.

**Cincinnati, O.**—By County Commissioners, contract for improvement of Miles road, to O. E. Robinson at his bid of \$8,007, also accepted his bid of \$3,521 for improvement of North Bend road.

**Columbus, O.**—Following is tabulation and results of bids received at letting on Oct. 30, 1914: Columbiana County, on Sec. 6, of the Unity-Salem Rd., I. C. H. No. 86, Pet. No. 1445, in Perry Twp. For grading roadway and paving with brick. Length 1,600 ft., or 0.30 mile. Width of pavement 16 ft., width of roadway 30 ft. Estimated cost of construction \$7,430. Date set for completion June 1, 1915. J. D. Paxon, Salem, O., \$7,269.20; Morgan Bros., Ravenna, O., \$6,980. Awarded to Morgan Bros., Ravenna, O.

Williams County, on Sec. "I" of the Edon-Cooney Rd., I. C. H. No. 311, Pet. No. 1517, in Florence Twp., for constructing the bridges and culverts, grading roadway and paving with waterbound macadam. Length 7,919 ft., or 1.50 mile. Width of pavement 14 ft., width of road-

way 24 ft. Estimated cost of construction \$14,210.61. Date set for completion, Aug. 1, 1915. The Yount-Jackson Co., Dayton, O., \$13,859.09; the Kelley Construction Co., Bryan, O., \$13,000; Rolla M. Myers, Attica, O., \$12,999; Stoll & Mann, Wakeman, O., \$14,200. Awarded to Rolla M. Myers, Attica, O.

Stark County, on Sec. "F" of the Canton-Massillon Rd., I. C. H. No. 68, in Perry Twp. For constructing the bridges and culverts, grading the roadway and paving with brick. Length 22,950 ft., or 4.35 miles. Width of pavement 18 ft., width of roadway 30 ft. Estimated cost of sand cushion and brick pavement, \$48,195. Estimated cost of bridges and culverts and construction of roadway, \$64,738.35. Date set for completion, Aug. 1, 1915. Deffenbacher & Sons, Massillon, O., \$46,200—\$62,700; the L. H. Young Construction Co., West Austintown, O., \$46,736—\$62,520.95; M. P. Connelly Co. & Son, Youngstown, O., \$48,000—\$61,000; Smith-Krabill, Canton, O., \$46,736—\$59,544.58; Shilling Construction Co., Youngstown, O., \$46,595—\$61,738.35; Frank L. Cohen, Buffalo, N. Y., \$43,605—\$59,200; the F. A. Downs Construction Co., Canton, O., \$46,668.80—\$63,134.65; Wm. H. Vogt & Sons Co., Massillon, O., \$47,870—\$63,562; the J. C. Devine Co., Alliance, O., \$45,695—\$61,700; the Enterprise Paving Construction Co., 8444 Broadway, Cleveland, O., \$48,195—\$58,158.55; Urban & Clements, Massillon, O., \$47,277—\$61,521.75. Awarded to Frank L. Cohen, Buffalo, N. Y.

Putnam County, of the Kalida-Lima Rd., I. C. H. No. 134, in Greensburg Twp. For constructing the bridges and culverts and grading roadway. Length 7,500 ft., or 1.42 mile. Width of roadway 24 ft. Estimated cost of construction, \$3,152.23. Date set for completion, June 1, 1915. Mustard Bros., Ada, O., \$3,149; John W. Allgire, Kalida, O., \$2,990. Awarded to John W. Allgire, Kalida, O.

Brown County, on Sec. "B" of the Georgetown-Wilmington R., I. C. H. No. 175, in Green Twp. For constructing the bridges and culverts, grading roadway and paving with waterbound macadam. Length 15,710 ft., or 2.98 miles. Width of pavement 14 ft., width of roadway 26 ft. Estimated cost of construction, \$31,385.84. Date set for completion, Sept. 1, 1915. No bids received.

Morgan County, on Sec. "B" of the McConnellsville-Caldwell Rd., I. C. H. No. 290, Pet. No. 1345, in Morgan and Bristol Twps. For constructing the bridges and culverts, grading roadway and paving with waterbound macadam. Length 9,490 ft., or 1.80 mile. Width of pavement 12 ft., width of roadway 26 ft. Estimated cost of construction, \$26,535.95. Date set for completion, Sept. 1, 1915. No bids received.

Wayne County, on Sec. "M" of the Wooster-Massillon Rd., I. C. H. No. 69, Pet. 754-755, in Sugar Creek Twp. For constructing the bridges and culverts, grading roadway and paving with brick. Length 16,764.9 ft., or 3.17 miles. Width of pavement 10 ft., width of roadway 26 ft. Estimated cost of construction, \$57,983.91. Date set for completion, Oct. 1, 1915. Harris & Miller, Millersburg, O., \$57,473; the Yount & Jackson Co., Dayton, O., \$57,484.91; J. C. McGarry Co., Kipton, O., \$57,400; G. B. Herring & Son, Cleveland, O., \$56,250; the J. C. Devine Co., Alliance, O., \$56,100; McDermott & Hannon, Niles, O., \$55,880; Doolittle & Garland, Kent, O., \$55,753.31; the Enterprise Paving & Construction Co., Cleveland, O., \$54,983.85. Awarded to the Enterprise Paving & Construction Co., Cleveland, O.

Lawrence County, on Sec. "F" of the Jackson-Ironton Rd., I. C. H. No. 400, in Washington Twp. For constructing the bridges and culverts and grading roadway. Length 15,840 ft., or 3.0 miles. Width of roadway 26 ft. Estimated cost, \$10,586.15. Date set for completion, July 1, 1915. The Ironton Transfer & Storage Co., Ironton, O., \$10,374.43; Jones, Bowman & Gothard, Ironton, O., \$10,226; J. C. Gannon, Ironton, O., \$10,100. Awarded to J. C. Gannon, Ironton, O.

Harrison County, on Sec. No. 2, of the Cadiz-Carrollton Rd., I. C. H. No. 371, Pet. No. 943, in Archer Twp. For constructing the bridges and culverts, grading and paving with waterbound macadam. Length 8,800 ft., or 1.67 mile. Width of pavement 12 ft., width of roadway 20 ft. Estimated cost of construction, \$13,249.50. Date set for completion, Sept. 1, 1915. Seiple & Wolf, Toledo, O., \$12,900; J. P. Warnick, Cadiz, O., \$12,343.12; J. P. Liggett, Hopedale, O., \$11,750; O. C. Gray, Cadiz, O., \$11,488; John M. Wheeler, Cadiz, O., \$11,343. Awarded to John M. Wheeler, Cadiz, O.

Lucas County, on Sec. "F" of the

Toledo-Napoleon Rd., I. C. H. No. 51, Pet. No. 716, in Providence Twp. For constructing the bridges and culverts, grading roadway and paving with water-bound macadam. Length 10,560 ft., or 2.0 miles. Width of pavement 16 ft., width of roadway 26 ft. Estimated cost of construction, \$23,610.63. Date set for completion, Sept. 1, 1915. The Gray Bros., Bowling Green, O., \$21,570. Awarded to the Gray Bros.

Hardin County, on Sec. "G" of the Roundhead-Ada Rd., I. C. H. No. 230, Pet. No. 1328, in Liberty Twp. For constructing the bridges and culverts, grading roadway and paving with water-bound macadam. Length 10,560 ft., or 2.0 miles. Width of pavement 16 ft., width of roadway 26 ft. Estimated cost of construction, \$7,842.30. Date set for completion, July 1, 1915. John S. Sheedy, Urbana, O., \$7,776.70; Theo. Vogelsburg, London, O., \$7,600; James W. Carey, Ada, O., \$7,345; Korah E. Kunkle, Dayton, O., \$7,183; J. C. Trissel, Ada, O., \$7,000; Soussley & Botkin, Ada, O., \$6,640. Awarded to Soussley & Botkin, Ada, O.

Scioto County, on Secs. "G" and "H" of the Portsmouth-Columbus R., I. C. H. No. 5, Pet. Nos. 663 and 873, in Clay and Valley Twp. For constructing the bridges and culverts, grading roadway and paving with brick and concrete. Length 27,480 ft., or 5.2 miles. Width of pavement 16 ft. Width of roadway 24 and 26 ft. Estimated cost of construction, \$83,921.90. Date set for completion, Sept. 1, 1915. Kelly Bros., Portsmouth, O., \$83,721; W. H. Ringwald & Sons, Chillicothe, O., \$82,420; Frank L. Cohen, Buffalo, N. Y., \$82,400; A. W. Burns & Co., 1741 N. 4th St., Columbus, O., \$81,820. Awarded to A. W. Burns & Co., Columbus, O.

Monroe County, on Sec. "F" of the Ohio River Rd., I. C. H. No. 7, Pet. 1020, in Ohio Twp. For constructing the bridges and culverts, grading roadway and paving with concrete. Length 5,705 ft., or 1.08 mile. Width of pavement 14 ft., width of roadway 26 ft. Estimated cost of construction, \$19,150.57. Date set for completion, Aug. 1, 1915. H. F. Green, Ravenna, O., \$18,998.83; the Foster Const. Co., Richmond, Ind., \$18,887.50. Awarded to the Foster Const. Co., Richmond, Ind.

Butler County, of the Columbia Bridge Rd., I. C. H. No. 44, Pet. No. 231, in St. Clair Twp. For constructing the bridges and culverts, grading roadway and paving with gravel macadam. Length 3,233 ft., or 0.61 mile. Width of pavement 16 ft., width of roadway 24 ft. Estimated cost of construction, \$13,233.60. Date set for completion, July 1, 1915. L. A. Dillon, Hamilton, O., \$11,394; Shields & Shields, Hamilton, O., \$12,997; Haynes, Craid & Wallace, Overpeck, O., \$12,900; H. W. Curry & Co., Eaton, O., \$12,570; Garver & Wirtz, Hamilton, O., \$10,702.58. Awarded to Garver & Wirtz, Hamilton, O.

Summit County, Cleveland-East Liverpool Rd., I. C. H. No. 12, Pet. No. 1359, in Twinsburg Twp. For constructing bridges and culverts, grading roadway and paving with brick. Length 12,833 ft., or 2.43 miles. Width of pavement 12.67 ft., width of roadway 30 ft. Estimated cost of construction, \$43,714.61. Date set for completion, Sept. 1, 1915. Geo. B. Herring & Son, Cleveland, O., \$43,500; Patterson & Grafton, Wellsville, O., \$43,342; the Enterprise Pav. & Const. Co., Cleveland, O., \$43,299.87; Lininger & Bennett, Conneaut, O., \$43,195; the L. H. Young Construction Co., West Austintown, O., \$42,520.43. Awarded to L. H. Young Construction Co., West Austintown, O. James R. Marker, State Highway Commissioner.

Springfield, O.—Commission has passed resolution approving awarding of contract to Krumholtz & Huonker for paving Belmont Ave. between Main and High Sts.

Beaver, Pa.—By State Highway Commissioner E. M. Bigelow, contract for building of state aid road from Monaca to Aliquippa, to Somerset Contracting Co., Somerset, for \$79,597.95.

Philadelphia, Pa.—Contracts have been let by Department of Public Works for \$98,568.08 worth of grading, asphalt paving and macadam surfacing. For grading 49,523 cu. yds., at an average price of \$0.247 per cu. yd., the low bidders were: P. J. Snyder Co., S. A. McClay, T. Clasby & Son, Andrew Peoples, J. J. McHugh and J. D. Dorney. This work totals \$12,800.79. For asphalt paving, including 6-in. concrete base, low bidders were Eastern Paving Co. and Barber Asphalt Co., at average price of \$1.544 per sq. yd. This work totals \$50,962.79. Dwyer & Co. were low bidders for \$3,601.50 worth of macadam pavement at an average price of

\$1.05 per sq. yd. Barber Asphalt Co. was the low bidder for \$31,203 worth of repairing and patching of asphalt pavements.

Dallas, Tex.—Contracts for doing \$250,000 worth of paving work, last big contract under proceeds of 25 per cent. paving tax for this year, have been let by Board of City Commissioners. One of large contracts, that of paving Pearl St. between Elm and Taylor, went to Roach-Manigan Paving Company. Street will be paved with 3½-in. wooden blocks with asphalt filler. The contract price is \$2.97 per sq. yd. Contract for paving Bishop Ave., between Jefferson and 6th, and for paving Canty, between Bishop and Zang's Blvd., was awarded to Standard Engineering Co., on bid of \$1.93 per sq. yd. Uvalde rock asphalt to be the material used. Same company received the contract for Lattimer St. paving between Grand Ave. and the Terminal Railway. Uvalde rock asphalt is to be used. The price for this street is \$1.92 per yd. Contract for paving Bowen St., between McKinney and Cedar Springs road, went to Texas Bitulithic Company on a bid of \$2.30 per sq. yd. for bitulithic paving material. While Commerce St., between Central Railroad and Exposition Ave., will be paved at expense of property owners in accordance with their petition, with exception of street intersections, board let the contract for this work. It went to Texas Bitulithic Co. on a bid of \$2.30 per sq. yd. This is largest contract of lot, and work will cost approximately \$75,000.

Princeton, W. Va.—For constructing roads, by County Court, contracts are as follows: Road from Athens to Lerona and from Princeton to Glyn Lynn, to Vaughan Construction Co., at \$22,937 and \$62,667; to T. Towles & Co., More-Montcalm Road, at \$54,968; Glatto Rock Road, \$38,290; Glatto-Springton Road, at \$29,128; Duhring-Goodwill Road, at \$12,892, and to Sullivan & Tillson, Bluefield-Bramwell Road, of macadam, at \$103,467, and road from Bluefield to top of mountain via Abshire Gap at \$27,415.

Lynden, Wash.—For cement sidewalks and parking on Grover St. to C. E. Moulton, Sumas, for \$3,721.

Olympia, Wash.—To Hayden Bros. & Bidwell, Portland, Ore., for surfacing of two miles of Pacific highway south of Woodland, in Clarke County, for \$6,960.

Puyallup, Wash.—Contract for laying mile and a half of cement sidewalk, in all sections of city, has been given by City Council to S. R. Greythe, price being \$1,462.10.

Seattle, Wash.—For grading of Mead St. contract has been awarded to R. T. Odman, at \$2,616.55, and for laying concrete walks on 44th Ave. South to B. H. Petley at \$1,314.85.

## SEWERAGE

Bridgeport, Conn.—City Auditor Bernard Keating has announced sale of \$300,000 issue of sewer bonds authorized at special election of May 16 last.

Stamford, Conn.—Proposition has been submitted to Common Council, for treatment of sewage in a reduction plant by the Sanitary Sewage Reduction Company, through its local council, J. F. Horton. They propose to install system by which sewage is sedimented, filtered and treated with ozone gas, with result that effluent from plant will be free from suspended matter, free from putrescible matter and with upwards of 90 per cent. of bacteria eliminated. Plant will be wholly contained in area of 75 ft. by 112 ft., and will be completely housed in with slightly building.

LaFayette, Ga.—Sewerage bond issue has been carried at special election. City will issue \$19,700 in bonds.

Indianapolis, Ind.—Plans have been adopted by Board of Public Works for sewer in Prospect St., from Pleasant Run to Sherman Drive. Estimated cost is \$22,000.

LaFayette, Ind.—Board has ordered bids advertised for construction of lateral sewer in Oregon St. This sewer will take care of property on south side of street in Ellsworth's addition.

Council Bluffs, Ia.—Final action has been taken in matter of some proposed sewer extensions in west end and motion was passed to advertise for bids for laying them. Bids to be opened Nov. 23. New sewer will aggregate 19,830 ft. of the following dimensions: 5,120, 12-in.; 5,070, 10-in.; 3,160, 8-in.; 6,480, 6-in. Mains are to be laid in alleys between Ave. A and Ave. B, from 17th to 20th Sts.; between Ave. B and Ave. C, from 17th to 20th Sts.; between

Broadway and Ave. A, from 31st to 37th Sts.; between Ave. B and Ave. C from 31st to 37th Sts. There is also to be some sewer in this contract for McGee Ave. from Benton St. to lot 16 in Hillcrest addition.

Hutchinson, Kan.—Contract for construction of more than 9,000 ft. of big sewer main for outfall sewer to the river will be let shortly. Following are bids of five companies bidding on work, these being based on 7,250 ft. of 30-in. circular monolithic concrete and 1,760 ft. of 27-in. vitrified tile: McLeon & Crandall, \$16,998.46; J. H. Shears & Son, \$17,038; Everett & Burt, \$15,883; Lee Bros., \$18,407; Stamey-Callahan Construction Co., \$16,069.30. Lower bid yet, however, was that of J. H. Shears & Son, based on 27-in. pipe being made of concrete. That made Shears' bid \$15,801.98, they bidding \$1.16 on concrete main.

Baltimore, Md.—Specifications on first contracts for sewer work out of new \$3,000,000 loan have been approved by Board of Awards and bids will be advertised on contracts without delay. About \$500,000 will be spent in work, which is included in five contracts, as follows: Lateral sewers in the area located north of Lanvale St., east of Fulton Ave., west of Fremont Ave. and south of Presstman St.; lateral sewers for the area located south of North Ave., northeast of an irregular line running from North Ave. and Broadway to Collington Ave. and Hoffman St. and northwest of an irregular line running from the latter point to North Ave. and Mine Bank Lane; trunk sewer, beginning at Stockholm and Ridgely Sts. and extending to an alley east of Scott St., to Ostend, to Ward, to Carey Sts. and to Columbia Ave.; trunk sewer beginning at end of interceptor north of Presbury St. and extending to the disposal plant on Slingluff Ave. Last contract provides for storm-water drains in various sections of city.

Baltimore, Md.—Election has resulted in favor of issuing sewerage bonds in sum of \$3,000,000.

New Bedford, Mass.—City Council Committee on street lights has voted to recommend that petition for sewers in Hemlock St., to cost \$1,300, and Rochembeau St., to cost \$2,000, be granted.

Duluth, Minn.—Sanitary sewers have been ordered constructed in Woodland Ave., from point opposite center line of lot 3, block 8, Woodland Park Division, to Wabasha St., and in Wabasha St. to Elysian Ave., and in 8th Alley, from 39th to 40th Ave. west. Second St., from 6th to 8th Ave. west and 8th St., from Woodland Ave. to Irving Pl., have been ordered sprinkled with oil. Work will all be done by day labor.

Duluth, Minn.—Two new sewers will be constructed in 8th alley, between 39th and 40th Aves. West, at cost of \$1,146.20, and in Woodland Ave. at cost of about \$1,863.84.

Passaic, N. J.—A. B. Leach & Co. has taken over about \$50,000 sewer bonds.

Plainfield, N. J.—Notice is given that on 23d day of November, 1914, at 8 o'clock p. m., at Council Chamber, No. 149 North Ave., Common Council will receive sealed bids for purchase of following described bonds of said city: \$92,000 5 per cent. sewer bonds, fifth series, dated Nov. 1, 1914, and \$75,000 joint sewerage system bonds, dated April 1, 1914. J. T. MacMurray is City Clerk.

Albany, N. Y.—Conservation Commission has approved application of sewer district No. 1, of town of New Hartford, for modification in design of proposed sewer in Thime Place, by increasing diameter thereof for distance of 1,200 ft. between Osborn and Madison Aves. to 8 ins. instead of 6 ins. as originally proposed in Proctor Boulevard it is proposed to construct 3,800 ft. of 6-in. sewer connecting to existing sewer in Genesee St. Sewage to be collected by these proposed sewers will discharge into Sauquoit Creek through existing sewage disposal plant.

Brooklyn, N. Y.—Sewer will be constructed on Fourth Ave. in Ridgewood Park.

Goshen, N. Y.—Proceeds of \$50,000 worth of sewer bonds, which were sold last August, have been practically exhausted and \$50,000 more of these bonds are advertised for sale on Nov. 23.

Jamestown, N. Y.—Special election will be held Nov. 21 to vote on question of issuing sewer bonds in sum of \$25,000.

Schenectady, N. Y.—Board of Contract and Supply has sanctioned construction of surface water sewer in Becker St.

from Division St. to Elm St. and relaying of 500 ft., more or less, of 20-in. sanitary sewer on Eastern Ave. Bids will be received for same until November 18.

**Syracuse, N. Y.**—Bond issue of \$10,000 is needed for system of storm water sewers in 1st and 2d wards, and \$100,000 to carry on Onondaga creek improvement in the spring. A large sum will also be needed for sewage disposal plant, for which plans are being prepared.

**Tottenville, S. I., N. Y.**—Borough President McCormack has advertised for bids for six important contracts. Two are as follows: No. 1—To construct a combined sewer, with the necessary appurtenances, in Cotton St. from Arrietta St. to Griffin St., together with all work incidental thereto. No. 2—To construct a temporary combined sewer, with the necessary appurtenances, in Maryland Ave., from Tompkins Ave. to Foxhall Terrace, and a temporary sanitary sewer connection from Tompkins Ave. to the upper end of the sewer in Maryland Ave., about 60 ft. east of Tompkins Ave., together with all work incidental thereto.

**Wappingers Falls, N. Y.**—See "Water Supply."

**Hazlewood, N. C.**—See "Water Supply."

**Coshocton, O.**—See "Water Supply."

**Coshocton, O.**—City Council has decided to build new sewage disposal plant on Charles Hoop land south of Roscoe. Plans are being prepared by Chester & Fleming, engineers.

**Marion, O.**—Steps for enlargement of sewage disposal plant have been taken by City Council. With view to also bettering sewer system, resolution was given first reading to construct sanitary trunk-line sewer on Center St. from Davids St. to disposal plant.

**Sandusky, O.**—Immediate sale of balance of \$125,000 bond issue for West End sewer and sewage disposal plant has been authorized by Council.

**Sandusky, O.**—Resolution providing for extension of West Monroe St. sewer from Superior St. to corporation line, has been passed upon rule suspension.

**Sandusky, O.**—Resolution has been adopted for sewerage Monroe St.

**Erie, Pa.**—Ordinance has been adopted providing for construction of 9-in. diameter lateral sanitary sewer in Front St., in the city of Erie, Pa., extending from Parade St. west 660 ft. more or less, together with necessary house connections. M. J. Henry is City Clerk.

**Upper Darby, Pa.**—Election has resulted in favor of issuing sewer improvement bonds in sum of \$150,000.

**East Providence, R. I.**—Work on extension of sewer on Broadway from Grove Ave., southerly, for about 450 ft., will begin shortly. Bids for job have been asked for by Superintendent Waldron of Administrative Board.

**Woonsocket, R. I.**—City is considering building a surface water drain in South Main St.

**Fort Worth, Tex.**—Discussion of plans for constructing sewage disposal plant for city, to put end to use of Trinity channel for that purpose, have been discussed by City Commission and it was decided to go ahead with preparations for the work. Mayor Milam and Finance Commissioner Smith were authorized to obtain propositions from sanitary engineers in regard to disposal plant, as well as in reference to proposed sanitary survey.

**Tacoma, Wash.**—Ordinance has been passed to authorize Commissioner of Public Works to construct storm water trunk sewer, with sub-sewer and branches, and all necessary manholes, inlets, boxes and connections with existing sewers; to appropriate sum of \$7,644, or so much thereof as may be necessary, from the General Fund for same.

**Superior, Wis.**—City Commission has under consideration number of sewer extensions. The Commission has already called for bids for rebuilding outlet of Central Ave. sewer, between Catlin Ave. and Birch Ave. This is in South End. Another improvement which will doubtless be made this winter is at end of Winter St. main sewer where it empties into the bay. A considerable part of outlet will have to be rebuilt, at cost of about \$10,000. Several other sewer jobs are being considered.

#### CONTRACTS AWARDED.

**Birmingham, Ala.**—Board of Commissioners have accepted offer of Southern Sewer Pipe Co. and American Cast Iron Pipe Co. to furnish material for improv-

ing 29th and 33d Aves., from 16th St. to 24th St., and directed Street Commissioner to immediately begin work of improving these avenues.

**Argenta, Ark.**—To Marino, Brooks & Burkham, St. Louis, Mo., for construction of sewer system in District No. 1 for \$228,477. Work consists of 17 miles of tile sewers and 3 miles of reinforced concrete sewers. Lund & Hill, Little Rock, Ark., are Engineers.

**England, Ark.**—To United Engineering & Construction Co., Muskogee, Okla., for installation of proposed sewage system.

**Orland, Cal.**—To G. E. Vincent for extension work on sewer and water systems for about \$12,000.

**Augusta, Ga.**—Main contract for sewer on Camille St., 7 ft. in diameter and 1,022 ft. in length, has been awarded to T. O. Brown & Son, who were the lowest bidders. Bids were asked both for brick and for concrete, condition of bottom of ditch to determine which will be used. Lowest bid for sewer of brick was \$9,395, and of concrete was \$13,238. Contract for dredging drainage ditch between the Wrightsboro Rd. and the Milledgeville Rd. and between the Savannah Rd. and Beaver Dam Canal was awarded to A. J. Twigg & Son, their bid, \$3,750, being the lowest submitted. Two minor contracts were also awarded, one for pipe sewer on Druid Park Ave., lowest bid for which was \$780; and another for pipe sewer on Hickman Rd., lowest bid being \$740. Both contracts were awarded to D. A. Bowe.

**Peru, Ind.**—Trippe Bros. were granted contract for extension of Grand St. sewer for sum of \$558.50.

**South Bend, Ind.**—By City Clerk, for constructing sewers as follows: High St. trunk sewer, to Henry De Vos, Birdsall St., South Bend; Milton Ave. pipe sewer, to De Peape & Coessens, Birdsall St., South Bend. W. S. Moore is City Engr.

**Hutchinson, Kan.**—The big sewer extension to Arkansas river, 7,250 ft. of 30-in. main and 1,760 ft. of 27-in. pipe, will be constructed by Everett & Burt. Contract was awarded by City Commission, contract price being \$15,883.80.

**Hutchinson, Kan.**—Bids have been opened for two sewer contracts. Shears & Son were given contract for Elm St. drain extension, running from 11th St. north and west to 17th and Main. Extension of Severance St. drain south from Ave. A to the Rock Island track will be constructed by the Stamey-Callahan Construction Co. The bids on these jobs were as follows: Elm St. drain extension; 4,300 ft. of 18-in. concrete tile; Shears & Son, \$3,049; Lee Bros., \$4,759.50; McLeod & Crandall, \$3,185.50. The Stamey-Callahan Construction Co., Everett & Burt and Griffin & Brown also had bids on vitrified pipe which were higher than these and not considered. Unit price bids ranged from 55 cts. by Shears & Son on concrete tile, to 90 cts. by Lee Bros. on No. 1 vitrified pipe. Severance St. drain extension, 620 ft. of concrete drain; Stamey-Callahan Construction Co., \$1,307.70; Griffin & Brown, \$1,364.60; Everett & Burt, \$1,567.60; Shears & Son, \$1,580; McLeod & Crandall, \$1,358.

**St. Paul, Minn.**—Bids have been opened for several public improvement contracts. Low bidders were: C. A. Nelson, \$496, for a sewer on Portland Ave., from Saratoga to Warwick Ave.; Neill & Preston, \$1,970 for a sewer on Fry St., from University to St. Anthony Ave.

**Plainfield, N. J.**—Cauldwell-Wingate & Co., of New York, which has contract for building joint sewer for Plainfield, North Plainfield and Dunellen, has notified Sewage Commission that it will be ready to begin operations in 10 days on 42-in. sewer main and agrees to employ all available help in Plainfield and vicinity.

**Rutherford, N. J.**—Council has awarded contract for Gouverneur Ave. sewer to Sizzo Construction Co. for \$470.95.

**Grand Forks, N. D.**—To Grand Forks Concrete Co. for 358 ft. 12-in. pipe sewer at 87 cts. and 20 ft. 8-in. pipe sewer at 70 cts., and to Carroll Bros., city, for 144 ft. 8-in. cast iron pipe at 50 cts., 552 ft. 12-in. at \$1.10, and 296 ft. 8-in. sewer pipe at 79 cts. A. S. Cameron Steam Pump Works, New York City, was awarded centrifugal pump and 2,200 voltage Westinghouse motor for \$925.

**Portland, Ore.**—By City Council for construction of Long Ave. and E. 45th Ave. southeast sewer system to Edward Sandberg, 74 E. 24th St. N. at \$15,064. Vitrified pipe will be used.

**Ebensburg, Pa.**—Ebensburg Borough Council has passed favorably upon plans

submitted by State for sewage disposal plant and agreed to accept two acres of land donated by Webster Griffith for that purpose. Sewage disposal plant will be erected next spring on Driggs farm.

**Providence, R. I.**—Following are successful bids received Nov. 9 for two sewers, also bids of unsuccessful bidders: Irene and Barrows Sts. to the Valley Co.—1,179 lin. ft. 12-in. pipe sewer, reg., 90 cts., \$1,061.10; 396 lin. ft. 12-in. pipe sewer, storm, 40 cts., \$158.40; 574 lin. ft. 6-in. drains to curb, 40 cts., \$229.60; 45 lin. ft. 8-in. pipe to basin con., 40 cts., \$18; 105 6-in. connections, 10 cts., \$10.50; 16 manholes, \$12, \$192; 2 catch basins, \$12, \$24; 2 extra inlets, \$7.50, \$15; total, \$1,708.60; 22 days. Twelfth St. to Charles Crankshaw—950 lin. ft. 12-in. pipe sewer, reg., \$1.75, \$1,662.50; 300 lin. ft. 6-in. drains to curb, 10 cts., \$30; 30 lin. ft. 8-in. pipe to basin con., 60 cts., \$18; 2 8-in. connections, 10 cts., 20 cts.; 91 6-in. connections, 10 cts., \$9.10; 8 manholes, \$25, \$200; 2 catch basins, \$20, \$40; 1 extra inlet, \$10, \$10; total, \$1,969.80; 30 days. Irene and Barrows Sts., unsuccessful bidders: Charles Crankshaw, 40 days, \$1,858.20; Frank A. Gammino, 25 days, \$1,721.51; Nelson W. Colgrove, 30 days, \$2,223.75; Lyons Bros., 30 days, \$2,189.30; Antonio Aiello, 35 days, \$1,730.52. Twelfth St.—Frank A. Gammino, 50 days, \$2,399.43; the Valley Co., 33 days, \$2,522.30; Nelson W. Colgrove, 20 days, \$2,223.93; Lyons Bros., 30 days, \$2,530.11; T. S. Messenger & Co., 45 days, \$2,693.30; Antonio Aiello, 45 days, \$2,246.73.

**Sioux Falls, S. D.**—Commissioner Mundt has reported that he had awarded contracts for construction of lateral sewers on following streets to Fanebunt Bros., as follows: 10th St., from Indiana Ave. to Cliff Ave., \$701.60; Menlo Ave., from 18th St. to 21st St.; 10th Ave., from 21st St. to 22d St., \$186.60.

**Richmond, Va.**—By City Administrative Board, for construction of Bacon Quarter branch sewers: Sect. 1-A—940 ft., to Burton Marye, Richmond, at following itemized bid: 7,600 cu. yds. excav. and refill earth, 45c.; excav. and refill solid rock, per cu. yd., \$2.50; extra fill, gravel or clay in foundation, per cu. yd., 75c.; 48 cu. yds. reinforced slab covering concrete, \$7.10; for brick masonry in sewers for M bricks, \$16; concrete in sewers plain per cu. yd., \$3.85; 3,940 cu. yds. concrete invert sidewalks and foundations plain, \$3.85; for extra concrete plain, per cu. yd., \$3.65; 58,000 vitr. blocks in invert (laid) per M blocks, \$24; timber in foundation per M ft., \$30; to lay and point T. C. pipe 24-in. per lin. ft., 4c.; 20-in., 4c.; 940 lin. ft. 18-in., 4c.; 15-in., 4c.; 12-in., 3c.; 10-in., 3c.; 2c.; 1,880 lin. ft. 6-in., 2c.; 300 lin. ft. 4-in., 2c.; 4,611 lbs. extra reinforcement, 2½c.; remove abutment walls, invert and bridge at Dinneen St., \$200; time 270 days; total \$20,718. Other bids: H. George, Jr., \$25,398; McAughey & Van Doren, \$23,447; E. L. Payne, \$24,697; Saville & Claiborne, \$22,293. Sect. 1-B—935 ft. to Saville & Claiborne, Richmond, at following itemized bid: 6,500 cu. yds. excav. and refill earth, 45c.; excav. and refill solid rock, per cu. yd., \$8; excav. and refill trenches for branch and house connections, per cu. yd., 55c.; extra fill, gravel or clay in foundation, per cu. yd., \$1.25; reinforced slab covering concrete, per cu. yd., \$5; for brick masonry in sewers for M bricks, \$16; for brick masonry in stacks and street basins, per M bricks, \$16; concrete in sewers plain, per cu. yd., \$4.50; 3,770 cu. yds. concrete invert sidewalks and foundations plain, \$4.05; for extra concrete plain, per cu. yd., \$4.50; 70,000 vitr. blocks in invert (laid) per M block, \$34; timber in foundation per M ft., \$30; to lay and joint T. C. pipe, 24-in., per lin. ft., 11c.; 20-in., 9c.; 935 ft. 18-in., 8c.; 15-in., 6c.; 12-in., 4c.; 10-in., 4c.; 8-in., 3c.; 1,870 ft. 6-in., 2c.; 370 ft. 4-in., 2c.; extra reinforcement, per lb., 4½c.; time, 180 working days, total, \$20,693. Other bids: H. H. George, Jr., \$23,442; McAughey & Van Doren, \$21,055; E. L. Payne, \$23,098; E. R. Siewers, \$26,968.

**West Allis, Wis.**—The Esau-Kroening Construction Co., of Milwaukee, has been awarded contract for additional tank for West Allis sewer system at \$12,560.

**Medicine Bow, Wyo.**—To J. S. Schwartz, 1015 Boulder St., Colorado Springs, Col., for installation of sewer system for \$3,404; 2,191 ft. 10-in., 705 ft. 8-in. and 1,311 ft. 6-in. vitrified clay pipe together with manholes, lampholes, wytes, etc. C. C. Carlisle, Cheyenne is Engineer.

## WATER SUPPLY.

**New Britain, Conn.**—City will ask next Connecticut Legislature for power to increase its water bond issue from \$350,000 to \$500,000 in order to develop the Burlington brook supply.

**Paris, Ill.**—City will vote Nov. 17 on question of issuing reservoir bonds in sum of \$90,000.

**Springfield, Ill.**—Resolution setting forth dire need of additional water mains in certain sections of city, owing to drying up of surface wells which are said to be contaminated and menace to public health, has been introduced in council by Commissioner Spaulding providing for 6-in. water main extensions in number of streets. Streets in which water mains are proposed are as follows: Jackson St., between 19th and 21st Sts.; 16th St., between East South Grand Ave. and Laurel St.; Enterprise St., between 13th and 14th Sts.; Matheny Ave., between 16th and 18th Sts.; Kansas St., between 18th St. and Wheeler Ave.; Pine St., between 13th and 14th Sts.; College St., between Ash St. and a point 500 ft. south; Renfrow St., between Laurel and South Sts.

**Spirit Lake, Ia.**—City is planning installing a filtration plant in the spring. Chas. F. Noll is Supt.

**Covington, Ky.**—City is planning to improve its water system.

**Hamilton, Mass.**—Better water supply system is urged.

**Wayzata, Minn.**—Election has resulted in favor of issuing water works bonds in sum of \$30,000. R. Bickford is Village Clerk.

**Sidney, Neb.**—Election has been carried in favor of issuing water extension bonds in sum of \$12,000. L. Neubauer is Town Clerk.

**Hamburg, N. J.**—Local residents are agitating installation of water system for the town.

**Morristown, N. J.**—In an effort to secure a 50-year franchise John Mills of Morristown, counsel for Whippany Water Co., made applications and resolution was unanimously passed introducing franchise at regular monthly meeting of Hanover Township Committee.

**Pateron, N. J.**—Installation of water supply in several sections of West Pateron is urged.

**Albany, N. Y.**—Bonds in sum of \$200,000 have been sold to Lee, Higginson & Co. and Kissel, Kinnicut & Co. of New York, for extension of city's water system.

**Binghamton, N. Y.**—Board of Water Commissioners have approved plans for improved water system throughout city prepared by Nicholas Hill, Jr., hydraulic expert. Plan suggested by Mr. Hill will be undertaken just as soon as drawings and measurements can be completed and necessary property acquired. Four tentative plans were submitted by Mr. Hill, costing \$313,665, \$305,039, \$304,343 and \$359,965 respectively. These all reach the same object, an increase in water service, by different methods. Plan adopted by Water Board is known as plan A-3, and will cost, when completed, \$304,343. It provided for distributing mains, with two new high service reservoirs, one with a capacity of 3,500,000 gallons, the other with a capacity of 750,000 gallons, located near Ross Park, to supply the South Side. This complete would cost \$304,343.

**Great Neck, L. I., N. Y.**—Following action of Port Washington Board of Trade in requesting town authorities to establish water district in that village so municipal water plant can be built, prominent civic workers here have plans under consideration for establishing municipal water plant here.

**Newtown, L. I., N. Y.**—Newtown Local Board has approved petition to acquire title to property and plant, including all wells, hydrant pipes, pumping stations, watersheds and water-bearing land; also, all water power houses and all property, real and personal, of Citizens Water Supply Co. necessary for supplying of water.

**Niagara Falls, N. Y.**—Water Board is considering installation of water sterilization plant to cost about \$31,000.

**Oleott, N. Y.**—Installation of water system is being considered.

**Palmyra, N. Y.**—Bids have been opened for sale of issue of \$33,000 worth of waterworks bonds for village. The bidders were: Security Trust Co., of Rochester, \$105; Union Trust Co., \$100.83; George B. Gibbons, New York, \$100.40. Bonds were awarded to Security Trust Co.

**Port Washington, L. I., N. Y.**—Petition is being considered for municipal water plant.

**Saratoga Springs, N. Y.**—A mass meeting of citizens of Saratoga Springs has been held for purpose of discussing question appropriating sum not to exceed \$100,000, to install filtration and aeration system in connection with village water works. Question of appropriating necessary funds will be voted on by taxpayers at special election.

**Wappingers Falls, N. Y.**—Bonds in sum of \$169,000 for water, sewer and state roads will be readvertised for sale.

**Hazlewood, N. C.**—Bond issue of \$15,000 has been issued for installation of complete water, sewer and light system.

**Coshocton, O.**—Coshocton city officials are figuring on special election to be held early in 1915, possibly in January, to vote on proposition for bond issues for sewage disposal plant and new water reservoir, total cost of both improvements being roughly estimated at about \$90,000. Water reservoir, which is to cost about \$40,000, will probably not have to be paid for by special taxation, but out of revenue of water works department.

**Marion, O.**—Voters in city have registered themselves in favor of authorization of \$500,000 bond issue for purchasing or constructing new municipal waterworks plant.

**Marion, O.**—Citizens have voted to issue \$500,000 bonds for construction of water works. Elmer E. Blazer is Clerk Board of Control.

**Mt. Blanchard, O.**—Citizens are said to have voted to issue \$10,000 bonds for water works.

**Boyetown, Pa.**—Borough will vote Nov. 27 on question of issuing water supply bonds in sum of \$13,000.

**Lykesville, Pa.**—Citizens have voted in favor of municipal water plant.

**Mont Alto, Pa.**—Installation of water system is urged.

**Pittsburgh, Pa.**—Ordinance has been introduced authorizing general installation of meters for all water supplied by city and providing for their installation.

**Texas City, Tex.**—Plans for extension of water system of Texas City as prepared by John W. Maxey, a Houston engineer, will make it possible for nearly every house in Texas City to have water connections. Industrial site will have especially strong water pressure. It is planned to install about 40 additional fire plugs.

**Cameron, Wis.**—Election has resulted in favor of issuing water works improvement bonds in sum of \$3,008. W. W. Pieper is Village Clerk.

**Hayward, Wis.**—Election has resulted in favor of issuing pumping plant bonds in sum of \$12,000. Clarence O. Bayo is Town Clerk.

**Niagara Falls, Ont., Can.**—Engineer Gardner has completed plans for new waterworks pump house in Stamford township, and Council will call for bids for its construction in a few days. Building will be 15 by 25 ft. in size and will cost about \$2,500.

## CONTRACTS AWARDED.

**Atlantic City, N. J.**—Contract for enlargement of Dougherty's Pond, at Absecon, where city's water supply is directed from, which calls for expenditure of about \$75,000, has been signed by Mayor Riddle and City Clerk Bell. Contractor Edward L. Bader was successful bidder.

**Branchville, N. J.**—To R. D. Wood & Co., 400 Chestnut St., Philadelphia, for supply of 150 ft. 6-in. and 800 ft. 8-in. cast iron water pipe at \$19.75 and \$19.25 respectively.

**Hillside, N. J.**—Township Committee has awarded to Elizabethtown Water Co. contract to install about 40 fire hydrants.

**Milftown, N. J.**—By Council to Schneider, Stelle & Co., 46 Paterson St., New Brunswick, for installation of collecting gallery about 500 ft. long, 3 ft. wide and 6 ft. deep. This collecting gallery will take water from about ten springs which have been located on 10-acre plot of property which Council recently acquired from Kuhlthau Bros. Co. It will be made of solid brick on one side and hollow tile on other so that water can get in, and from this gallery water will go to reservoir about 30x15 ft., and it will also be arranged so that two wells can be fed from this source.

**Cornwall, N. Y.**—Bids for supplementary shaft and tunnel of Catskill Aqueduct at base of Storm King Mountain, in town of Cornwall, have been opened. The Oscar Daniels Co. was granted

contract by Board of Water Supply, with lowest bid of \$365,926.

**Riverhead, N. Y.**—To W. G. Fritz Co., Newark, N. J., for installation of waterworks system. Walter E. Sexton, Mineola, is engineer.

**Billings, Okla.**—To Humrichause Construction Co., Carmen, Okla., for installation of water works and electric light plant for \$22,412. E. T. Archer & Co., Kansas City, Mo., are the engineers.

**Muskogee, Okla.**—By Supervisor Indian School, for 8,600 lin. ft. 6 and 8-in. sewer pipe, 6,200 ft. 2-in. high pressure gas main, 1,400 ft. 4-in. c.i. water pipe, to John W. Rooks, of McAlester.

**Lebanon, Pa.**—The bids for the supply of water for fire use and for installation of fire hydrants throughout town for better fire protection has been awarded to Lebanon Valley Consolidated Water Supply Co., who will begin immediately on work of installing hydrants.

**Mullins, S. C.**—The Municipal Improvement Co. of Augusta, a new corporation, has secured an \$80,000 contract for installation of modern waterworks sewerage system, awarded to them by city of Mullins, S. C.

**Polytechnic, Tex.**—To J. M. George, Fort Worth, for trenching and laying of 6 and 8-in. water main 2 1-3 and 2 1/2 ft. deep; also furnishing of lead jute and settling fire hydrants. Contract will consist of about 7,500 ft. of mains.

**Seattle, Wash.**—By Port of Seattle Commission, for equipping Hanford St. warehouse with supply system and fire protective system, to Automatic Sprinkler Co. of America, at \$15,584.

**Seattle, Wash.**—For construction of water mains to Giulio Argentieri at \$7,011.08.

**Medicine Bow, Wyo.**—To J. S. Schwartz, 1015 E. Boulder St., Colorado Springs, Col., for installation of waterworks system. Work calls for 50,000-gal. steel tank on 75-ft. steel tower; 3,221 ft. 4-in. and 1,015 ft. 6-in. Class B cast iron pipe with fittings and valves, etc. Contract price, \$8,071. C. Carlisle, Cheyenne, is engineer.

**Transcona, Man.**—By city for furnishing and installing pumping machinery, including electrical equipment, to Dominion Equipment & Supply Co., Winnipeg, Man., at \$14,255. W. M. Scott is Engr., Sterling Bank Bldg., Winnipeg.

## LIGHTING AND POWER

**Pomona, Cal.**—Methods of installing ornamental street lamp posts are being considered.

**Daytona, Fla.**—Ordinance to grant to Michael Sholtz and his associates a franchise to install and maintain electric light and power system in city of Daytona has passed on first and second reading and referred to ordinance committee.

**Nokomis, Ill.**—Election has resulted in favor of issuing lighting plant bonds in sum of \$25,000.

**Anderson, Ind.**—Board of works has opened bids on turbine generators for city electric light plant. The Allis-Chalmers Co., of Milwaukee, was lowest bidder; the Westinghouse Co., of Philadelphia, second, and General Electric Co., of Schenectady, N. Y., third. Bids ranged from \$37,000 to \$40,000. Board of public works also opened bids on additional equipment, including pumps for city water plant, estimated to cost \$25,000. The bids were referred to water department and committee for further consideration. Board deferred award of contract for turbine generator for city light plant, estimated to cost \$40,000, according to bids submitted by three companies.

**Peru, Ind.**—Plan has been made to install cluster lights on Broadway.

**Portland, Ind.**—Town of Bryant, six miles north of Portland, is soon to have electric lights. Firm of Brown & Son has been granted 25-year franchise and is arranging to install complete electric plant.

**Muscatine, Ia.**—A uniform plan of street lighting is being considered by city beautifying committee of Muscatine Chamber of Commerce. Chairman of committee has tentatively outlined plans for adoption of boulevard lighting, but declared that form of lighting to be carried out along business streets would be left to judgment of business people.

**Corbin, Ky.**—Election has been carried in favor of issuing electric light plant purchase bonds in sum of \$10,000. Jas. T. Nelson is Mayor.

**Lake Charles, La.**—Installation of "white way" on Ryan St. is proposed.

**Fenton, Mich.**—Common Council will take action on boulevard system of lighting for Leroy St. It was decided to

install three-light system from the Fenton House to Langworthy's drug store, at corner of Leroy St. and Shawawee Ave. Thirty ornamental posts weighing from 375 to 500 pounds are to be used. Clerk was instructed to advertise for bids for posts. E. A. Lockwood, village electrician, will superintend work of installing the system.

**New Haven, Mo.**—Election has resulted in favor of issuing electric light and water bonds in sum of \$10,000.

**Omaha, Neb.**—Referendum petitions may be circulated and question of giving Omaha Electric Light and Power Co. a five year contract to light streets submitted to the people if council passes ordinance authorizing such a contract.

**Perth Amboy, N. J.**—Election has resulted in favor of issuing lighting plant bonds in sum of \$150,000.

**Red Bank, N. J.**—Board of Commerce is discussing lighting problem.

**South River, N. J.**—Petition has been received by Council from property owners along Turnpike from Tanner's Corner to New Middlesex Club House asking extension of the electric light system along this thoroughfare, which included Newton Heights. The matter was referred to Light Committee.

**Batavia, N. Y.**—Proposition, prepared by H. K. Stein, Superintendent of Genesee Light and Power Co., for furnishing electric power for running of all machinery at municipal plant, will be presented to Board of Aldermen. If electricity should be used in place of steam city would be obliged to purchase new equipment at estimated expense of \$15,617, which Genesee Light and Power Co. in its proposition offers to install, advancing money, and receiving its pay in annual installments, with 6 per cent. interest yearly on unpaid balances.

**Bergen, N. Y.**—At special village election in Town Hall taxpayers voted on proposition that village establish system by purchase and installation of plant and equipment for transforming, transmitting and distributing electric current from Niagara Falls, or elsewhere, at cost not to exceed \$4,500, exclusive of value of plant now owned by village. Proposition was carried by 80 to 3.

**Binghamton, N. Y.**—Municipal light plant bonds in sum of \$148,000 will shortly be sold.

**Ithaca, N. Y.**—This city may have more electric lights in residential section as result of action taken by Board of Public Works. Proposition is to replace each arc lamp with three incandescent lamps. This arrangements will give 375 lights instead of 125 for four and a half years until present contract expires.

**Lestershire, N. Y.**—Matter of having gas mains extended west on Main St. to Riverside Drive this fall so that there will be no interference with paving work in spring is again being taken up by Board of Trustees.

**Schenectady, N. Y.**—Ordinance has been passed approving of extension of "Luminous Way" district to South Center St. from State to Smith Sts.

**Watertown, N. Y.**—Another step towards municipal lighting for Watertown has been taken when resolution was adopted authorizing city attorney and city engineer to secure services of most capable expert on electric lighting to assist city in gaining idea as to probable cost of building and maintaining municipal lighting plant.

**Watertown, N. Y.**—Town Boards of Wilna and Diana will hold joint session at Central House on Nov. 24 to decide on proposition to set off light district which includes village of Natural Bridge and surrounding territory, and to make contract with Watertown Electric Light & Power Co. for lighting of streets, roads, public buildings and residences in lighting district.

**Hazlewood, N. C.**—See "Water Supply."

**Butler, O.**—Bids will be received by F. L. Beal, Clerk, until noon, Dec. 10, for purchase of bonds in sum of \$4,000, for repairing electric light plant or purchasing gas engine for same.

**Dayton, O.**—City Commission is planning boulevard lighting of various streets.

**Sandusky, O.**—Plans are being considered for installation of "white way" in business district.

**Urbana, O.**—Board of Control and Light Committee of City Council had a meeting with Superintendent W. P. Hurd, of the Urbana Light Co., and J. F. Hanley, general manager of the Federal Light Co.'s Ohio interests. It was definitely decided to install single standard light system in business district instead of cluster system. Twenty-six standards were decided upon, but more may be installed.

**Youngstown, O.**—H. Whitford Jones, lighting engineer, who has been preparing plans for modern street lighting system for Youngstown has completed his report and is ready to file it with council.

**Connellsville, Pa.**—New plan of lighting prepared by Engineer Hirst is being considered.

**Pittsburgh, Pa.**—Better street lighting is urged for Smithfield St. section.

**Philadelphia, Pa.**—Preparations are now being made for electric lighting seven miles of Northeast Boulevard which is now in use. In his estimate for arc lighting Boulevard from Broad St. to Rhaw St., Chief Pike, of Electrical Bureau, has asked \$90,000. Electrical Committee of Councils has approved estimate of needs of bureau for 1915 which included item for arc lights for Boulevard. Request was referred to Finance Committee for final approval.

**Johnson City, Tenn.**—The Johnson City Council has just passed on final reading the Wagner-Dunn Gas franchise, which practically guarantees that this city will have a large gas plant in operation within a few months' time. It means the expenditure of \$125,000 in Johnson City within next few months.

**Burlington, Vt.**—Meeting will be held Nov. 18 at 3 p. m. to see if city will vote bond issue of \$50,000 for enlarging and improving electric light plant.

**Portsmouth, Va.**—Light committee of Council has recommended purchase of a test meter, at cost of about \$300.

**Seattle, Wash.**—Bids will be received by H. W. Carroll, City Comptroller, at noon, Nov. 28, for purchase of \$404,000 light extension bonds.

**Tacoma, Wash.**—At meeting of City Council recommendation was made for extensive lighting plans for immediate placing in various parts of the city. Plans include territory from Cliff Ave. to Yakima Ave., between North 3d and North 6th Sts., and the streets between and the alley crossings, where clusters of ornamental lights are to be placed. It is intended to place ornamental lights on South D St. from South 7th St. to South 21st St. and on Jefferson Ave. from Pacific Ave. to South 21st St. and on South 17th St. from Pacific Ave. to D St. Steel poles were recommended.

#### CONTRACTS AWARDED.

**Montague City, Mass.**—Contracts for power-house at Montague City have been let to Fred T. Ley & Co. of Springfield and Thomas Bros. of Turners Falls, former doing steel and concrete work and latter brick and mason work.

**Newark, N. J.**—Award of contract to light Essex County sections of Passaic River bridges and Lincoln Highway to Public Service Electric Co. has been recommended by Essex County members of joint bridge committee of Essex and Hudson County. Bid from the Public Service Co. was only one received. It was for \$80 a year for arc lamps of 2,000 candlepower and \$15.30 a year for 32-candlepower incandescent lamps. The contract calls for a minimum of 128 incandescent and 60 arc lights, each to burn 4,001 hours per annum. The term is for five years, starting Nov. 15, and gives the usual 2½ per cent. discount for a contract for that period.

**Seneca Falls, N. Y.**—The Central New York Gas & Electric Co. has signed contract with Geneva, Seneca Falls & Auburn Railway, Inc., whereby former agrees to furnish latter with current of 500-kilowatt capacity for operation of its line between Geneva and Seneca Falls for period of ten years.

**Temple, Tex.**—City Council and Mayor J. E. Watters have agreed upon 5-year contract for street lighting with Texas Power & Light Co. to replace agreement which has just expired. Under new contract 43 additional lights are secured at small increase in cost. One hundred and eighty-four street lights in all are to be furnished, of which number 23 are arcs and remainder tungstens for use in residence districts. Cost to city will be in neighborhood of \$5,000 per annum.

#### FIRE EQUIPMENT

**Texarkana, Ark.**—Fire Chief Springer has asked council to authorize purchase of 1,000 ft. of new hose for fire purposes, which request was referred to fire committee.

**Carpinteria, Cal.**—Purchase of chemical engine is being considered. H. W. McCampbell is interested.

**Indianapolis, Ind.**—Bids will be opened at office of Jacob P. Dunn, city controller, Nov. 20, for \$80,000 worth of bonds for improving fire department. It is proposed to use \$28,000 in building

two new fire engine houses and \$52,000 for equipment.

**Wichita, Kan.**—Purchase of triple combination car is being considered.

**Louisville, Ky.**—Ordinances have been passed for erection of various fire hydrants.

**Boston, Mass.**—Motorization of three more water towers in fire department has been authorized by Mayor on receipt of recommendations from Fire Commissioner Grady. City will have towers equipped with tractors at plant of British-American Manufacturing Co., at Providence, which recently delivered water tower No. 2 fully equipped. Three towers will be equipped at cost of \$16,610, and will be delivered in 90 days. One of towers will be sent to house of chemical 7 of East Boston, and others will be in use in business district.

**Hamilton, Mass.**—Purchase of motor chemical is recommended.

**Haverhill, Mass.**—New fireproof fire headquarters may be erected in Washington Sq.

**Salem, Mass.**—Fire Chief has recommended purchase of another auto pumping engine.

**Port Huron, Mich.**—City Council is considering purchase of additional apparatus.

**Duluth, Minn.**—Better fire protection is promised the Oneota and Hazelwood Park district.

**Camden, N. J.**—Purchase of fire boat is being discussed.

**Haddon Heights, N. J.**—Election has resulted in favor of issuing fire department bonds in sum of \$5,000. E. C. Ridgway is Borough Clerk.

**Lambertville, N. J.**—About four pieces of apparatus may be motorized.

**Midland Park, N. J.**—Question of issuing bonds for purchase of motor apparatus will be submitted to voters.

**Binghamton, N. Y.**—Ordinance is being considered to authorize Fire Commissioner F. E. Woodruff to purchase fire apparatus in open market.

**Binghamton, N. Y.**—Board has directed City Clerk Foster to advertise for proposals for furnishing fire department with two pieces of motor apparatus. One is to be combination hose and chemical apparatus, similar to other machines now in use in department. Fire Commissioner Woodruff has spent much time in preparing these specifications and plans call for all standard materials. Color of apparatus will be red chassis with maroon body, stripings and lettering being of gold leaf. Board also asked for bids on motor city service truck which is to replace present horse-drawn truck at Central Fire Station. This is also to be of standard make. Proposals will be received at meeting of the Board to be held Nov. 18.

**Little Falls, N. Y.**—Vice President Leary of police and fire board has asked that permission be granted his board to purchase automobile for use of chief fireman. Plan is to have small truck equipped with chemical extinguishers. Chief and one fireman would use truck to reach fire quickly when their services were most needed. Cost would not exceed \$700. Council gave approval.

**Watervliet, N. Y.**—City is considering purchase of motor combination chemical and hose wagon for Oswald Fire Co., and motor hose wagon for Arsenal City Fire Co.

**Fostoria, O.**—City has sold \$10,000 bond issue for purchase of one piece of motor apparatus and other equipment.

**Philadelphia, Pa.**—Plans have been prepared for erection of new station to cost about \$75,000.

**Sherman, Tex.**—Bids are being received for 1,000 ft. of fire hose. H. Zimmerman is city secretary.

**Alexandria, Va.**—Purchase of a motor city service hook and ladder truck is recommended.

**Wheeling, W. Va.**—By Board of Control, to James Boyd & Bro., 25th and Wharton Sts., Philadelphia, for supplying motor-driven aerial truck, at \$8,950.

**Fond du Lac, Wis.**—Fire Committee of Council has reported favorably on purchase of motor triple combination.

**Casper, Wyo.**—City is considering purchase of a light motor chemical wagon. Oscar Hiestand is Chief.

**Ottawa, Ont.**—Purchase of three pumping engines have been recommended by underwriters. Tractor-drawn steamers are favored. J. W. Graham is Chief.

#### CONTRACTS AWARDED.

**Boulder, Col.**—City Council has purchased White auto fire truck for University hill station, to cost \$3,310.20, from White Co., Cleveland, O.

**Lafayette, Ind.**—Board of works has awarded contract for new automobile for use of fire chief to Main Street Auto Co. at \$1,497.50.

**Peru, Ind.**—One thousand feet of new fire hose has been purchased; 500 from the Boston Woven Hose & Rubber Co., and 500 ft. from the Manhattan Rubber Co. There were nine fire hose companies bidding.

**Shelbyville, Ind.**—Contract has been awarded to Gamewell Fire Alarm Telegraph Co., Grand Central Bldg., New York, for new storage batteries and switchboards for operating fire alarm system.

**Portsmouth, Va.**—Chief Walker has filed with council his budget request for 1915, asking for appropriations aggregating \$31,526.50 to carry forward fire department during ensuing year.

**Everett, Wash.**—By City Commissioners to American-LaFrance Fire Engine Co., Elmira, N. Y., for furnishing auto fire truck at \$6,950.

## BRIDGES

**Phoenix, Ariz.**—Erection of bridge across Gila at Pima Station is being planned.

**Wilmington, Del.**—Finance committee has been authorized to advertise for bids for remaining \$150,000 of \$250,000 New Castle County bridge improvement bonds, which were passed by last legislature for construction of new 3d St. bridge over Christina River.

**Richmond, Ind.**—County is considering new bridge over Whitewater.

**Keokuk, Ia.**—Plans for reconstruction of Keokuk and Hamilton bridge have been approved by war department.

**Ludlow, Ky.**—Election has resulted in favor of issuing viaduct bonds in sum of \$15,000.

**Haverhill, Mass.**—New bridge across Merrimack river at Washington Sq. is being favorably considered.

**Holyoke, Mass.**—In meeting of Board of Park Commissioners a communication was received from Planning Board in which recommendation was made that single span concrete bridge be erected across Elmwood Park at intersection of Jackson and Pine Sts.

**St. Louis, Mo.**—The \$2,750,000 bond issue to complete municipal bridge has been carried.

**Camden, N. J.**—Bids have been opened for sale of \$14,000 worth of Broadway bridge bonds. These bonds are to pay 5 per cent., and are to mature in 20 years. Bonds were sold to Arthur H. Tappan, who paid premium of \$770.

**Brooklyn, N. Y.**—Board of Estimate will recommend immediately appropriation of about \$400,000 for following changes in Queensboro Bridge to adapt it for operation of rapid transit trains: Preparation of plans by Bridge Department and cost of reconstructing upper level of bridge for operation of Second Ave. elevated trains. Removal of inside set of trolley tracks, and to provide for operation of trolley cars on brackets outside of main trusses. Repavement of entire floor of lower level for vehicular traffic. Relocation of footwalks on upper level outside of main trusses.

**Dolgeville, N. Y.**—Town board of Manheim will lay out about a thousand dollars this fall in repairing bridges over Beaver Brook in this village, at Slawson St., Cline St. and Van Buren St.

**Newfane, N. Y.**—Proposition for appropriation of \$20,000 for new bridge over Eighteen Mile Creek at Ide Rd., has been carried at recent election.

**Niles, O.**—Ordinance has been passed to issue bonds for rebuilding foot bridge over Mahoning River beside Lisbon track of Erie Railroad.

**Portland, Ore.**—Bids for Multnomah county bonds to amount of \$250,000 divided into denominations of \$100, \$500 and \$1,000, so that public at large may invest, have been opened. Money realized will be expended in construction of interstate bridge across Columbia river from Portland to Vancouver, Washington. Multnomah county recently voted \$1,250,000 in interstate bridge bonds and Clarke county, Washington, \$500,000.

**Woonsocket, R. I.**—City is contemplating building of two concrete bridges over Blackstone river.

**Norfolk, Va.**—Upon recommendation of Acting City Engineer Taylor controllers rejected all bids received for construction of two sets of safety gates at York St. bridge, estimates received being in each case more than amount appropriated for this improvement. Bids ranged from \$2,350 to \$2,800.

## CONTRACTS AWARDED.

**Red Bluff, Cal.**—County Board of Supervisors have awarded C. E. Cotton of San Francisco contract for construction of eight bridges over route of State highway from Glenn county line to Corning. Bridges will be constructed of concrete instead of steel, because upkeep of steel bridges is much greater than those constructed of concrete. Cotton's bid was \$24,723. Other bidders were: William Stephens, \$28,350; Chico Construction Co., \$25,985; Walcott & Brunk, \$27,850; H. C. Cameron, \$29,984, and R. W. Moller, \$25,500. McCartney & Haskell were given contract for construction of the Salt Creek bridge, east of Red Bluff. Their bid was \$2,674.

**Boulder, Colo.**—Contract for construction of concrete bridge over Beasley ditch on 15th St. has been awarded to M. E. Chamberlain for \$721.20.

**Elberton, Ga.**—For constructing steel bridge over Broad River, at Moore's Shoals, for Elbert and Madison Counties, to East St. Louis Bridge Co., East St. Louis, Ill., at \$10,195.

**Turners Falls, Mass.**—Selectmen have awarded contract for I-street bridge over canal to United Construction Co. of Albany, N. Y. Bridge is to be 16 ft. in width, with 67-ft. span. It will be of steel with a capacity of 10 tons. Contract price is \$1,014.

**Santa Fe, N. M.**—For constructing bridge over Rio Grande River, at Arrey, to Midland Bridge Co., Kansas City, Mo., at \$9,900, 4 spans, 65 ft. each, piers and abutments, and 60 ft. creosoted piling. J. W. Johnson is Asst. State Engr.

**Miamisburg, O.**—Contract for construction of the superstructure of Miami river bridge at Linden Ave., Miamisburg, which is to displace one destroyed by 1913 flood, has been awarded by county commissioners to The Brookville Bridge Co. of Brookville on company's low bid of \$44,800.

**Connellsville, Pa.**—By County Commissioners for constructing steel bridge with concrete floor over Reslar's run in Saltlick Township to Louis Cesta at \$448, and for similar bridge over Champion Creek in same township to Scudder & Younk at \$463.10.

**Lewistown, Pa.**—To Wagaman Bros., Dallastown, Pa., at about \$20,000, for construction of bridge on Dorcas St.

**New Castle, Pa.**—For constructing bridge over Connoquenessing Creek to Canton Bridge Co., Canton, O., \$108,400.

**Wilkes Barre, Pa.**—Contract for construction of East End bridge has been awarded to the Neald Construction Co., of Pittsburgh.

**Chattanooga, Tenn.**—At least \$125,000 worth of material to be used in construction of new bridge across Tennessee River is to be purchased in Chattanooga. Contract for all sand and gravel has been awarded to Bible Sand Co. and one for all cement to Dixie Portland Cement Co. About 75,000 cu. yds. of sand and gravel will be used and about 60,000 barrels of cement.

**St. Catharines, Ont.**—To Campbell & Lattimer, Toronto, at \$21,744, for construction of concrete substructure of steel viaduct over old Welland Canal.

## MISCELLANEOUS

**Sacramento, Cal.**—All the State building bonds, including \$3,000,000 for a Capitol extension building, and \$750,000 for State fair improvements have been carried.

**San Francisco, Cal.**—Plans and specifications for cable section of proposed Church St. municipal railway will probably be ready about Dec. 1.

**Tallahassee, Fla.**—The Internal Improvement Board has decided to advertise for bids on sale of \$1,500,000 of 6 per cent. drainage bonds, proceeds of which are to be used in continuing drainage operations in the Everglades.

**Augusta, Ga.**—Bids for \$250,000 of City of Augusta flood protection bonds of 1914, have been opened by finance committee of city council. The committee, however, reached no decision as to awarding of bonds. Highest bidder for same was Field, Richards & Co., of Cincinnati, whose bid was \$231,580 for the whole amount, or 92.63.

**Portland, Ind.**—Engineer has been instructed to prepare plans and specifications for clearing of Salamonina River Channel.

**Independence, Kan.**—Bonds in sum of \$5,000 have been voted for incineration plant.

**Neodesha, Kan.**—Question of installing incineration plant is being considered.

**Baltimore, Md.**—New automobile will be purchased for use of the Marshall.

**Boston, Mass.**—Plans have been drawn for new police station for Mattapan district.

**Haverhill, Mass.**—Purchase of new street signs is being discussed.

**Taunton, Mass.**—Committee on streets and bridges has rejected all bids for new ash collecting cart to be purchased by city. Rejection, it was explained by members, was to allow new set of specifications to be submitted for new proposals.

**Duluth, Minn.**—Ordinance providing for issuance of \$50,000 of park bonds, of which \$26,000 will be for addition to Fairmont park is being considered.

**St. Paul, Minn.**—Bond issue of \$400,000 has been voted for municipal ice plant.

**Omaha, Neb.**—Purchase of new automobile for police department has been authorized by city council on request of Superintendent A. C. Kugel.

**Millville, N. J.**—Bids for safety gates at bridges in Bridgeton and Millville have been opened by freeholders in Bridgeton and contracts will be awarded at later date. Bids were as follows: Cox & Son, Bridgeton, \$1,078.50; Groton Bridge Co., Groton, N. Y., \$1,475; Bridgeton Construction Co., \$1,770.

**Paterson, N. J.**—Sum of \$600 has been appropriated to be used for a survey of playground work.

**Rutherford, N. J.**—Sanitary committee has recommended advertising for removal of ashes and garbage bids to be received on Nov. 27.

**Little Falls, N. Y.**—Resolution has been adopted directing purchase of 30-horsepower Overland runabout for use of fire department.

**Middletown, N. Y.**—At special election to be held on Dec. 3, taxpayers of this city are to be given opportunity to say whether they are in favor of purchase of piano factory site, at corner of Railroad Ave. and Grove St., for municipal purposes.

**Solvay, N. Y.**—The Trust & Deposit Co. of Onondaga has purchased \$40,000 worth of 5 per cent. bonds issued by village of Solvay, paying premium of \$188. Issue was authorized recently, proceeds to be used for village improvements.

**Yonkers, N. Y.**—Ordinance has been approved authorizing construction of new incinerating plant to cost about \$50,000.

**Niles, O.**—Purchase of street signs has been recommended.

**Urbana, O.**—Notice is given that Auditor of Champaign County, O., will sell on Nov. 23, 1914, at 11 o'clock a. m., in office of County Commissioners in Urbana, O., bonds of Champaign County, O., in aggregate sum of \$3,000. There will be six bonds of \$500 each, in the Graham Ditch, No. 396, numbered 1 to 6 inclusive. O. E. Eby is Co. Auditor.

**Connellsville, Pa.**—City has authorized issue of \$100,000 Funding and Improvement Bonds. John L. Gans, Supt. Accounts and Finance can supply further information.

**Connellsville, Pa.**—Acting on recommendation of Superintendent of Public Safety F. W. Wright, council has authorized purchase of Draeger pulmotor with two oxygen helmets and self-rescuers for use of fire department. Apparatus will cost \$264.

**Pittsburgh, Pa.**—Four ordinances for sale of bonds amounting to \$5,430,000 have been passed on the first reading.

**Philadelphia, Pa.**—About \$1,000,000 of the \$7,000,000 bond issue has been sold.

**Galveston, Tex.**—Bids will be advertised at once for erection of \$300,000 city hall and auditorium.

**Richmond, Va.**—Alderman Workman has introduced resolution authorizing Administrative Board to buy city farm at cost not to exceed \$23,037.50, which is available for purpose from recent bond issue. It was referred to Committee on Public Buildings, Properties and Utilities.

**Richmond, Va.**—By unanimous vote board has concurred in ordinance authorizing issue of \$34,430, proceeds from which will be used exclusively in permanent improvements in recently annexed territory. The issue, which bears 5 per cent. interest, will run for thirty-four years.

**Tacoma, Wash.**—Ordinance has been adopted to authorize Commissioner of Public Works to call for bids and let contract for construction of bulkhead in Puyallup River above 11th St. bridge, according to plans and specifications on file in his office, and to appropriate sum of \$5,500 or so much thereof as may be necessary.